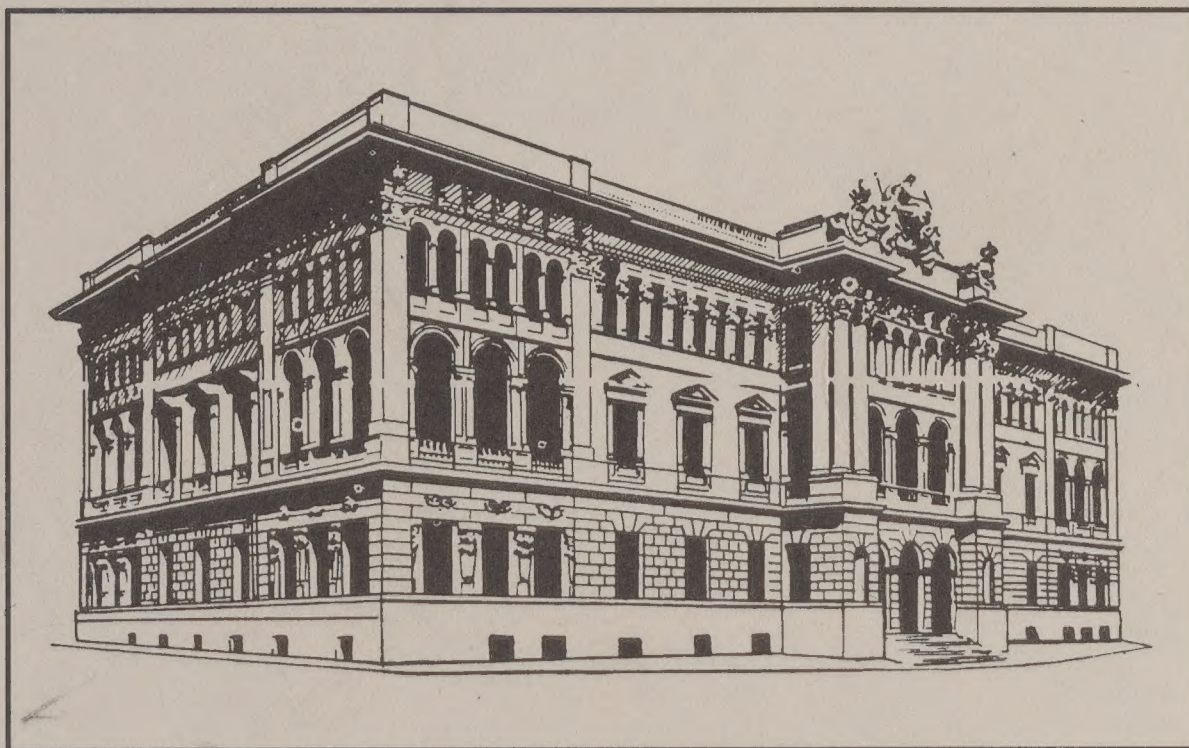


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DI
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“GIACOMO DORIA,,

PUBBLICATI PER CURA DI R. POGGI



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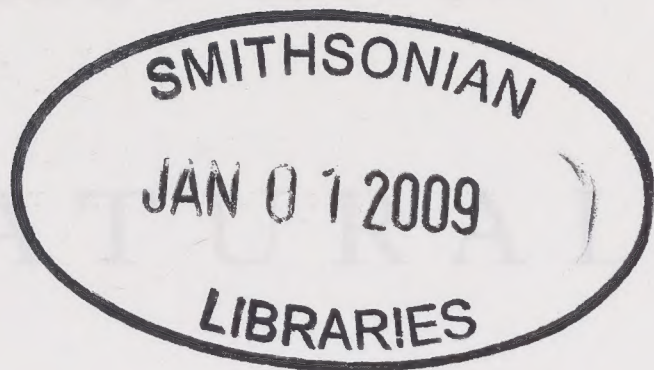
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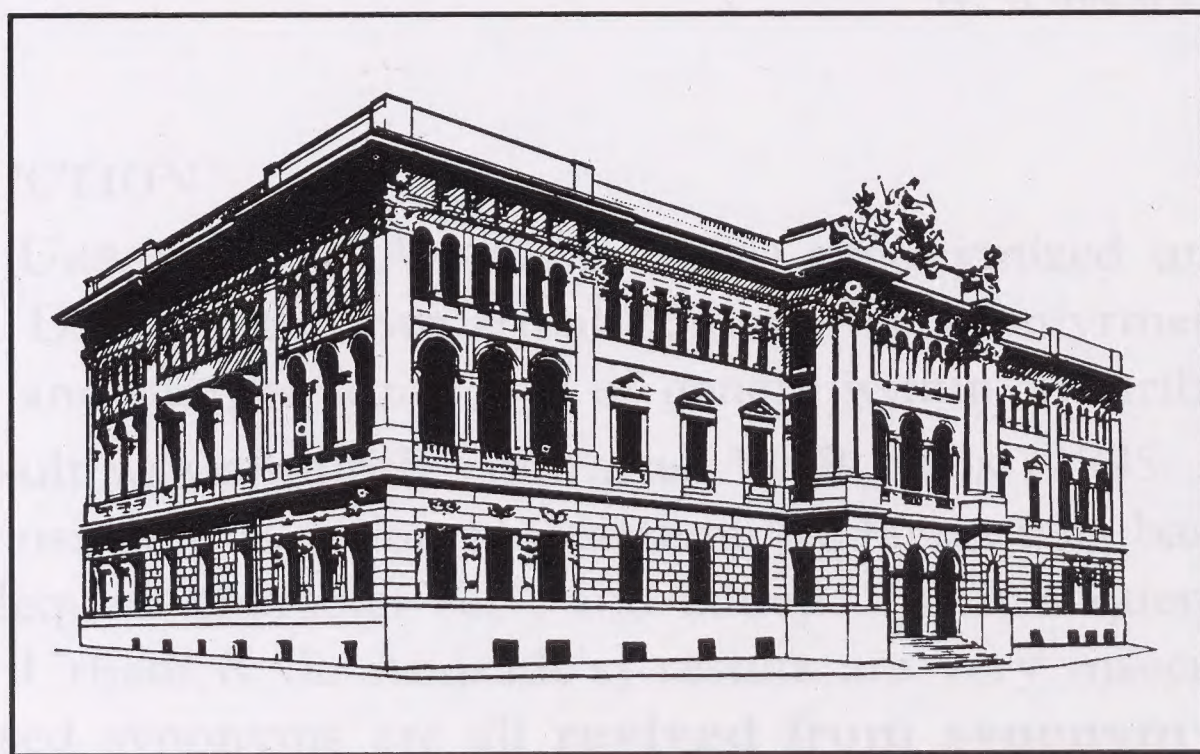
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CESARE BARONI URBANI* & MARIA L. DE ANDRADE*

THE ANT TRIBE DACETINI: LIMITS AND CONSTITUENT GENERA, WITH DESCRIPTIONS OF NEW SPECIES

(HYMENOPTERA, FORMICIDAE)

“As new species are discovered... the characters separating... genera are gradually losing their distinctiveness, and it seems likely that we may eventually see most of these genera merged again in one large genus”.

W. L. BROWN (1973a: 3)

1. INTRODUCTION

BARONI URBANI & DE ANDRADE (1994) synonymized under the tribal name Dacetini the two tribal names Phalacromyrmecini and Basicerotini and merged a number of genera within the tribe.

This result was promptly contrasted by BOLTON (1995: 47) who wrote: “I consider this action too extreme by far as it is based on a grossly inadequate character set”, and added “In consequence their [i.e. Baroni Urbani & de Andrade’s] results are very insecure, and their proposed synonyms are all **revived from synonymy** [bold-face by Bolton] here”. As a matter of fact BARONI URBANI & DE ANDRADE (1994) reached their conclusions after examining each and every character used by Bolton and others to separate the genera in question. As a consequence of this, Bolton’s statement of character inadequacy applies much better to his generic resurrections than to the synonymies proposed by BARONI URBANI & DE ANDRADE (l. c.).

All these generic names re-appeared hence as valid names in BOLTON (1995) and most of them also in a number of subsequent papers, including BOLTON (1998) and in other papers published afterwards by uncritical entomologists.

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None of these 1995-1998 generic revivals, however, is listed where one would expect to find them, i.e. under the “taxonomic history” of generic names in BOLTON (2003).

The reason for this omission is that only one year after his unexplained revival of our synonyms, BOLTON (1999), with a dramatic inversion of course, synonymized again all genera already synonymized by BARONI URBANI & DE ANDRADE (1994) under *Strumigenys* under two genera, i.e. *Strumigenys* (including only *Quadristruma* as proposed by ourselves in 1994) and the revived genus *Pyramica*, a former synonym of *Strumigenys* now including all other genera that we previously synonymized under *Strumigenys*.

Pyramica, described by ROGER (1862), was considered as a synonym of *Strumigenys* only one year after its description by the same ROGER (1863b) and never received generic status again until BOLTON (1999). This last, entirely new and radically different classificatory scheme is adopted by BOLTON (2000, 2003) and by all his uncritical followers that rejected our synonymies only one year before.

BOLTON's (1999-2003) classificatory system is supported by an impressive display of morphological erudition enforcing generic boundaries, phylogenies, and conclusions by introducing a remarkable set of new characters. Unfortunately, many of these characters are used for the first time with the sole support of unclear descriptions, and are seldom backed by good illustrations, definitions and unequivocal statements about their presence or absence among critical taxa.

One of the greatest difficulties that we faced was interpreting a number of Bolton's characters. Often slightly different rewordings of the same sentence are used in different papers to define presumably different synapomorphies. For instance:

BOLTON (1998: 72) states that the “labrum with an impression... on the labral shield, distal of the basal hinge but proximal to the labral lobes” is synapomorphic for all his “dacetonines”. But, one year later, BOLTON (1999: 1681) defines the “labrum mediodorsally with a very broadly and deeply concave depression in its proximal half” as autapomorphic for the genus *Epopostruma*. We are unable to understand why these two very similar definitions should be considered as two independently derived characters related to two different clades and not as two slightly different rewordings of the same

character description. We already raised this point in a web document (BARONI URBANI & DE ANDRADE, 2006b) and BOLTON (2006b) replied by adding that his 1998 definition is repeated in BOLTON (2003:54). This is perfectly true, of course, but it does not justify at all the double role attributed to the same character in two different positions within the same clade.

In other instances, two characters used by Bolton in the same context but for different purposes simply contradict each other:

BOLTON (1998: 73) writes that the “propodeal spiracle low on side of sclerite, abutting the margin of the small metapleural gland bulla” is unique to the Basicerotini and Phalacromyrmecini, while the “Dacetonini (sic!)... [have the] propodeal spiracle... widely separated from metapleural gland”. But BOLTON (1999: 1649, character 22 and table 1), contradicting his own former statement, attributes the “metapleural gland bulla abutting or very close to annulus of propodeal spiracle” to 5 out of 9 genera of Dacetini considered...

Other characters, like the katepisternal groove, given as synapomorphic for the tribe Phalacromyrmecini, proved to be present in only one species and absent even in the type genus of the tribe, *Phalacromyrmex* (see later the discussion of our character # 36), i.e. they appear to have been imagined only to support a particular classification. BOLTON (2006a) admits *obtorto collo* the failure of this character but insists that it should be re-defined and considered just the same....

These three examples, among many more possible ones, should be sufficient to show the need for the present study and to justify our previous appreciation of Bolton's work. Other examples will be dealt with under the individual character analysis in this paper.

Another very important difference lies on the fact that in BOLTON (1999-2000), absence or presence of a given trait in a taxon are often declared *a priori* as due to secondary loss or to homoplastic gain. These statements, however plausible they may be, are equivalent to the assertion that the evolutionary path of the group is already known and invalidate the meaning of any phylogenetic deduction based on them.

We made an effort to ban potential proclamations of faith from our analysis.

This was already anticipated by BARONI URBANI & DE ANDRADE (2006b) but BOLTON (2006b) insists on the correctness of his approach and this forces us to further explain two additional aspects: 1. In this paper, to infer phylogeny and classification, we shall code a trait as present or absent or polymorphic in a given genus according to its observed record in that genus; BOLTON (1999), on the contrary, codes it in the way that he thinks better reflecting his idea of the phylogeny. This has nothing to do with the plausibility of Bolton's ideas; it is simply a matter of method. 2. Assuming that a clade can be defined by a trait presumably lost in some of its members is unacceptable since this would potentially allow creation of unlimited clades (and taxa) for any set of species with and without the trait in question. To do so, one needs only to suppose the secondary loss of a critical apomorphy among the species without it.

Our working hypothesis is that the differences in method between Bolton and us are worth consideration and should yield significantly different results.

In spite of its pertinence to the subject, we shall pay less attention to a recent contribution by DIETZ (2004). The reasons for this are twofold: 1) Dietz's analysis is largely inspired by and, in its motivations, differs insignificantly from the ones of BOLTON (1998-2000), and 2) Dietz's data differ considerably from those of Bolton and also from Dietz's own character descriptions. We tentatively explain this anomaly by a number of typing mistakes in Dietz's published data matrix, mistakes presumably absent from or unlike those of the matrix that Dietz used for calculations. Our hypothesis is supported by the fact that searching for the shortest tree(s) for DIETZ's (2004) published data by means of PAUP 4.0b (see later, the methods chapter) yields results radically different from those of DIETZ (2004).

These discrepancies between character descriptions and character coding render difficult any attempt to evaluate Dietz's arguments and conclusions and, for this reason, in this paper we will discuss only the most controversial of them.

In this paper, on the contrary, we shall discuss all the characters used by Bolton on the base of the factual evidence available to us.

2. MATERIAL AND METHODS

We were able to study material deposited in the institutions listed below.

- ANIC. Australian National Insect Collection, C.S.I.R.O., Canberra, Australia.
- BMNH. The Natural History Museum, London, UK.
- FMNH. Field Museum of Natural History, Division of Insects, Chicago, U.S.A.
- GOPC. The amber collection George O. Poinar, Jr. maintained at the Oregon State University, Corvallis, Oregon.
- MCZC. Museum of Comparative Zoology, Harvard University, Cambridge, Mass.
- MHNG. Muséum d'Histoire Naturelle, Genève, Switzerland.
- MIZA. Museo del Instituto de Zoología Agrícola "Francisco Fernández Yépes", Maracay, Venezuela.
- MSNG. Museo Civico di Storia Naturale "Giacomo Doria", Genoa, Italy.
- MZSP. Museu de Zoologia, Universidade de São Paulo, Brazil.
- NHMB. Naturhistorisches Museum, Basel, Switzerland.
- PUCE. Museo de Zoología QCAZ, Escuela de Biología, Pontificia Universidad Católica del Ecuador, Quito, Ecuador.

In addition, we were able to study two Baltic amber specimens (a worker and a gyne) from the collection of Mr Jörg Wunderlich, Straubenhardt (Baden-Württemberg, Germany) that we identified as *Agroecomyrmex duisburgi* (Mayr) or a species very close to it. In spite of its relevance for the present study, the genus *Agroecomyrmex* was not explicitly included in our analysis. Examination of the two specimens from the collection Wunderlich did not allow assessment of some characters needing proper mounting or dissection and did not permit morphological inferences much better than those already possible from the figures of WHEELER (1915a).

To assess optimal rank of and phylogenetic relationships between taxa, we performed a cladistic analysis including all genera considered as valid by BOLTON (1998-2000) and as many as possible of the characters used by BOLTON (1999) and elsewhere.

2.1. OUTGROUP COMPARISON

BARONI URBANI & DE ANDRADE (1994), for their cladistic analysis, choose as outgroup the Attini and two genera with presumably superficial similarities with the Dacetini, i.e. *Stegomyrmex* Emery and *Calyptomyrmex* Emery. BOLTON (1999) used only *Myrmica* Latreille as outgroup. Bolton's choice was not explained but it can be probably justified since it includes an apparently unspecialized myrmicine. We are still convinced that our earlier choice has better chances to include a near relative of the Dacetini than the one of Bolton, but *pro bono pacis*, for this study we consider most of our former outgroups plus *Myrmica* as Bolton did. On the other hand, the Attini were not considered any more in the present analysis. The reasons for this are that, for a better comparison with our ingroup taxa, all Attini genera should have been individually considered for the analysis and this would have raised the total number of taxa under study to a figure preventing any form of exact search for the shortest tree(s).

In addition to our 1994 outgroups, we included in the analysis also a representative of the genus *Tatuidris* Brown & Kempf, a purportedly distantly related genus belonging to a different subfamily according to BOLTON (2003) but possessing a mandibular kinetic similar to the one apomorphic for the Dacetini according to BARONI URBANI & DE ANDRADE (1994: 10) and BOLTON (1998: 68-70). We regard this state of affairs as an excellent reason to include *Tatuidris* in our analysis. To avoid that our search might force *Tatuidris* to appear too close to the dacetine genera (e. g. by choosing *Myrmica* as sole outgroup and *Tatuidris* + the dacetines as ingroup) or unnaturally too far from them (e. g. by artificially transferring *Tatuidris* among the outgroups), we included in our study two genera clearly belonging to two separate but related subfamilies, i.e. *Pseudomyrmex* Lund and *Myrmecia* Fabricius. In our parsimony analyses we considered *Pseudomyrmex* and *Myrmecia* as the sole outgroups. *Pseudomyrmex* is meant to represent the subfamily Pseudomyrmicinae, i.e. the sister-subfamily of all other ants considered in this paper and *Myrmecia* is the sole genus constituting the subfamily Myrmeciinae, also close to the Myrmicinae (BARONI URBANI *et al.* 1992; BARONI URBANI 2005).

Study of the possible phylogenetic relations of *Tatuidris* by means of *Pseudomyrmex* and *Myrmecia* as outgroups will not ben-

efit from consideration of their respective autapomorphies. On the contrary, we considered for our analysis the three synapomorphies of the Myrmicinae as given by BOLTON (2003: 52). These should exclude *Tatuidris* from the Myrmicinae. But we thought it fair considering also two potential Myrmicinae synapomorphic characters described by BARONI URBANI *et al.* (1992) and shared by all classic Myrmicinae genera, including *Tatuidris*.

To assess presence or absence of some internal structures among the taxa under consideration we dissected the following species:

Basiceros disciger (Mayr).

Calyptomyrmex sp.

Colobostruma sisyptha Shattuck.

Eurhopalothrix bruchi (Santschi), *platisquama* Taylor, *procera* (Emery).

Mesostruma turneri (Forel).

Myrmecia pyriformis F. Smith.

Myrmica scabrinodis Nylander.

Octostruma sp., *O. stenognatha* Brown & Kempf.

Orectognathus sp.

Protalaridris sp.

Pseudomyrmex sp. 1 & sp. 2.

Pyramica alberti (Forel), *argiola* (Emery), *decipula* (Bolton), *denticulata* (Mayr), *eggersi* (Emery), *jacobsoni* (Menozzi), *kichijo* (Terayama, Lin & Wu), *membranifera* (Emery), *minima* (Bolton), *myllorhapha* (Brown), *nannosobek* Bolton, *nepalensis* (de Andrade), *semicompta* (Brown), *subedentata* (Mayr), *tenuissima* (Brown), *urrho-bia* Bolton, *zeteki* (Brown).

Rhopalothrix ciliata Mayr.

Stegomyrmex vizottoi Diniz.

Strumigenys chapmani Brown, *doriae* Emery, *ekasura* Bolton, *elongata* Roger, *emmae* (Emery), *exilirhina* Bolton, *godmani* Forel, *grandidieri* Forel, *harpyia* Bolton, *koningsbergeri* Forel, *lanuginosa* Wheeler, *lyroessa* (Roger), *micretes* Brown, *paranetes* Brown, *rogeri* Emery, *saliens* Mayr.

Tatuidris tatusia Brown & Kempf.

If, on one hand, this list may be shorter than what we wished, on the other the number of structures apparently escaped to the attention of former students and discovered by us in the species listed above is surprising. Moreover, the monograph by BOLTON (2000) alone revealed a precious, nearly exhaustive source of reliable information contrasting with the information contained in BOLTON's (1998 & 1999) previous character descriptions and generic boundaries.

For our phylogenetic analysis the evolution of all characters was considered as unordered. BOLTON (1999) states that only three of the characters considered by him were treated as unordered without specifying how the remaining characters were considered. By analysing Bolton's data and considering all characters as unordered, we obtain the same results as Bolton (*l. c.*). We explain this coincidence by supposing that Bolton coded most of his characters as ordered but, as a matter of fact, since most of his characters are binary, there is no difference between ordered and unordered binary characters. Differences arise only when computing with multi-state characters.

In the following we give a list of all the characters that we retained as potentially phylogenetically significant and of their coding. Differences with BOLTON (1999), if any, will be explained and justified in each character description. We felt compelled to exclude from computation some characters resulting from the literature. A list of these excluded characters and the justification for their exclusion will be given after the list of the characters used.

A parsimony analysis of all genera treated as valid in the most recent literature was performed by PAUP 4.0b10 (SWOFFORD 2002). Search for the shortest tree(s) was done by means of the mathematically exact algorithm "Branch-and-Bound".

Some graphic display and character tracing was obtained by MacClade 4.05 (MADDISON & MADDISON 2002).

To enable a simple judgement on valid or invalid genera, whenever possible, we tried to include in our data at least one known and undoubted autapomorphy for each genus. Genera that, at the end of our analysis, resulted destitute of any kind of apomorphies (*i.e.* genera without valid apomorphies already known from the literature and without apomorphies representing secondary gains or losses of other characters appearing as a result of our character optimization) will be considered as synonyms of their closest related genus.

While discussing the results of the phylogenetic analyses and in order to give a possible evaluation term of the characters on which our classification is based, all critical apomorphies implying a nomenclatorial decision are reported with their individual Consistency Index and Retention Index as computed by PAUP 4.0b10 and MacClade 4.05 on the Strict Consensus Tree of Figs. 33 and 34. Determining the number and quality of the synapomorphies at critical branches was performed by means of MacClade.

Measurements and indices used in the text for species descriptions are the following:

- HL = Head Length: the maximum measurable distance between the medial margin of the vertexal angles and the antero-medial margin of the clypeus with the head in full frontal view.
- HW = Head Width: maximum measurable head width with the head in full frontal view.
- ML = Mandible Length: maximum length of the mandible between the antero-medial margin of the clypeus (concave margin excluded when present) and the mandibular apex.
- EL = Eye Length: maximum length of the eye.
- SL = Scape Length: length of scape shaft, excluding the basal condyle.
- WL = Weber's Length: diagonal length of mesosoma from the anterior pronotal border (excluding neck) to the distal edge of the propodeal lobe.
- TL = Total Length: combined head length in full-face view (closed mandibles included), Weber's length of mesosoma, petiole and postpetiole lengths (in profile) and length of gaster (in profile).
- CI = Cephalic Index: $(HW/HL) \times 100$
- MI = Mandibular Index: $(ML/HL) \times 100$
- SI = Scape Index: $(SL/HL) \times 100$
- MTI = Mandibular-Torular Index: (Distance between the intersections of the external margins of the closed mandibles with the anterior clypeal border/Distance between the outermost points of lower margins of toruli) $\times 100$. BOLTON (1998) proposes an operational "Mandibular-Torular

Index (MTI)" to quantitatively express the old qualitative dacetine character "pear-shaped head". However, according to the anthropological and biometric practice as already codified in myrmecology by RAIGNER & VAN BOVEN (1955) and current use in ant literature including other Bolton's printed papers, Bolton's MTI is a ratio (and also Bolton calls it so) and not an index. An index should be the ratio between two measures where the presumably smallest one, multiplied by 100, is divided by the larger one. The ant literature already offers several examples of such indices, like the Cephalic Index (CI), the Scape Index (SI), Petiolar Index (PI), etc. Bolton's quotient, hence, should be called "Mandibular-Torular Ratio" or, to maintain the name index and the acronym MTI as we did in the present paper for uniformity with the other indices, Bolton's MTI should be multiplied by 100. Furthermore, percent expressions like $CI = 125$, $SI = 56$, for example, offer small diction and mnemonic facilities as compared with rough ratios like $CI = 1.25$ and $SI = 0.56$.

Defenders of the deregulation may object that, in this same paper, we also use the name index for ratios like the Consistency Index and the Retention Index for characters and for phylogenetic trees. These terms, however, are already established in the cladistic literature and the linguistic consistencies or homoplasies of cladism are far beyond the scope of the present work.

3. CHARACTER CHOICE AND TAXONOMIC RANK

There are no general rules but only intuitive guesses drawn on taxonomic experience on which characters could be "good" or "bad" in defining genera or tribes.

Though the temptation was strong, we will not discard any of Bolton's generic characters as BOLTON (1987: 285) did for the genus *Diplorhoptrum* by means of vague statements like "I am unable to regard... [this morphology of the male volsellae] as being significant above the species-group level", even if we believe that this same statement would better fit any of Bolton's Dacetini genus-level characters rather than *Diplorhoptrum*. As a matter of fact, *Diplorhoptrum*

appears as the perfectly sound and well-defined sister-genus genus of *Solenopsis* as shown by BARONI URBANI (1995), a citation omitted by BOLTON (2003) in his synopsis of ant classification. Irreducible sceptics, in addition, may have a glance to the *Diplorhoptrum* male volsellae by means of a SEM: they will discover a previously unknown, new structure in ant morphology. We consider this, still unpublished, ultrastructural particularity as a redundant, impressive argument in favour of *Diplorhoptrum*'s generic validity.

The current situation of the Dacetini classification forces us to acknowledge the obvious: 'good' supraspecific taxa like genera and tribes, in ants as in other organisms, must be characterized by at least one unequivocal synapomorphy holding for all the species involved. Homoplasy occurs among distantly related taxa. When the same trait appears occasionally in closely related clades, this is more likely to be due to common ancestry and, until proof of the contrary, this trait cannot be used to separate monophyletic genera or tribes. Stated otherwise, all members of a taxon (species, genus, tribe, or subfamily), and not just the majority of them, should share at least one, clear synapomorphy characterizing that taxon. This is not the case of the Dacetini genera as they are currently defined. In this respect, the present study should be considered as a considerable but still far from optimal improvement of the existing classification.

The numerical and morphological diversity of the Dacetini is still much inferior e.g. to the one known for the ant genus *Camponotus* (see e. g. EMERY 1925). On the other hand, some of the repeatedly blamed *Camponotus* subgenera are better defined and biogeographically more meaningful than some currently accepted Dacetini genera.

In our research we entirely concur with BOLTON (1999:1640) in adopting "an opening hypothesis that every genus-group name listed be regarded as invalid until proved otherwise by the establishment of apomorphic characters". But, contrarily to BOLTON (l. c.), decisions about individual character apomorphy in this study will be taken only by means of standard algorithms like PAUP 4.0b10 (SWOFFORD, 2002) and MacClade 4.05 (MADDISON & MADDISON, 2002) applied to observed character distributions and not on personal opinions.

We are aware that a species-level cladistic analysis of the ca. 900 known Dacetini species might suggest additional branches supported

by weak synapomorphic characters convergent with other clades or secondarily disappearing in other, closely derived branches. Such a species-level analysis is too difficult for a so high number of species although one might expect that it will weaken or strengthen currently accepted synapomorphies. In our genus-level approach, the classificatory value of true or presumed generic apomorphies was evaluated in terms of Consistency and Retention Indices within the same genus-level analysis as already stated in the Methods chapter.

We made an effort to use as many as possible of the characters employed in the papers by BOLTON (1998 & 1999) (see the discussion about the individual characters' inclusion or exclusion). This approach poses nonetheless a dilemma about the phylogenetic value of many of the characters that we used. A practical example should be sufficient to exemplify our doubts.

BOLTON (1998) used for the first time characters like presence or absence of a katepisternal groove and deeply (as opposed to superficially) impressed labium and other similar traits to define genera and tribes for members of his "dacetonine tribe group". One may be tempted to discard these characters as phylogenetically irrelevant.

But Bolton's work should not be detracted so simply. BOLTON (l.c.) tried to strengthen his work by identifying more than one often apparently insignificant characters overlapping in distribution.

Discovery of such overlapping character sets might influence our phylogenetic reconstructions and even apparently insignificant characters, by reciprocally supporting each other, might result in plausible supraspecific synapomorphies. Since sharing of the same trait among closely related branches is better explained by common descent rather than by homoplasy, these apparently insignificant traits can be considered as synapomorphic and, hence, can be used to construct phylogenies, only if A) they are uniform within all the taxa to be classified and B) they affect all and only the taxa in question.

Unfortunately, one of the major results of our study will be that neither condition A nor B is ever met for most characters supposed to be relevant for the dacetine phylogeny. Stated otherwise, all current attempts of phylogenetic reconstructions for the Dacetini (BARONI URBANI & DE ANDRADE, 1994; BOLTON, 1998; present study) are weakened at the root by being drawn on characters of doubtful phylogenetic significance. There is no mention of better characters

in the ant literature and we were unable to discover superior ones. All these studies, however, find their justification in proposing a classificatory model as sound and as credible as possible.

For instance, the most impressive known synapomorphy for the tribe Phalacromyrmecini so far is the presence of a katepisternal groove. Rank attribution to a character (and hence to the taxon possessing it) is always a subjective evaluation. For the Phalacromyrmecini our study will show that the katepisternal groove is not synapomorphic since it is present in only one species of one genus among the three genera supposed to constitute the tribe (see later, the discussion of our character # 36). Nonetheless, assuming that a scientist will discover a species of a genus whatever with a katepisternal groove, or with a deeply (as opposed to superficially) impressed labium, should this hypothetical scientist place this species in a different genus and tribe? And, assuming that our hypothetical myrmecologist would really do so, how many other myrmecologists will follow him/her accepting the new genus and tribe? Our guess is none. Or, at least, we so hope.

Our optimistic guess is likely to be contradicted anyway by numerous students of behaviour, ecology, histology, etc. These students will even not try to understand the possible phylogenetic meaning of a katepisternal groove. Of course: they are not taxonomists. They will nonetheless use the newly proposed nomenclature in order to show that they are knowledgeable *even* with the latest novelties of taxonomy.

We cannot change this situation but we regret that mentally lazy taxonomists may also follow the same course of action. During the tormented history of the Dacetini classification, this already happened when 18 Dacetini genera like *Smithistruma*, *Epitritus*, *Kyidris*, *Glamyromyrmex*, *Dorisidris*, etc., considered as synonyms by BARONI URBANI & DE ANDRADE (1994), were erroneously revived by BOLTON (1995) as everybody admits today.

4. RESULTS

4.1. LIST OF CHARACTERS AND OF THEIR RECORDED STATES

Before discussing the morphological characters used to construct the phylogeny and classification of the Dacetini, a physiological trait,

the mode of action of the mandibles, should be briefly considered. Although without using it directly in his analysis, BOLTON (1999) makes an extensive description and treatment of it emphasizing its phylogenetic relevance.

The two modes of mandibular action observed among the Dacetini are seemingly mutually exclusive and were improperly named as “static pressure” as opposed to “kinetic” mandibles. Naturally, every kind of movement, including those necessary to exercise a pressure whatever, is kinetic and never static by definition.

The “static pressure” and “kinetic” mandibles, however, have been observed in a too small number of species to be seriously considered as a taxonomic character, but, in our character analysis, we shall discuss the distribution of their presumed most important morphological correlate which is assumed to be taxonomically and phylogenetically relevant according to BOLTON (1999). This is the maximum angle between the open mandibles. This biometric character resulted too variable to be considered among the phylogenetically significant ones listed below but it will be nonetheless discussed in detail for its presumed discriminatory value between the “genera” *Pyramica* and *Strumigenys* (see later the definition of the genus *Strumigenys* in Chapter 4.5).

Nonetheless it must be added that, from a purely cladistic point of view, the whole discussion has little interest since the mandibular kinetic alone – as its morphological correlate(s) alone – are inadequate to the separation of the two “genera” since one of the two will inevitably result paraphyletic to the other.

The following is an annotated list of the morphological characters tentatively retained to infer a phylogenetically drawn classification of the Dacetini. In the great majority of cases, all characters referred to the worker caste in the literature and in the following list may be assumed to repeat the (unknown) gyne condition as well.

1. Worker. Maxillary palps six-jointed (0), five-jointed (1), four-jointed (2), three-jointed (3), two-jointed (4), one-jointed (5), absent (6). This is character # 8 of BARONI URBANI & DE ANDRADE (1994) and character # 1 of BOLTON (1999), transformed respectively from five and three to seven steps to better consider genera not considered by BARONI URBANI & DE ANDRADE (l. c.) and by BOLTON (l. c.). DIETZ (2004, character # 7) also increases the number of

steps of this character as we did, but from three to six steps only. The reason for this is that no outgroups with six jointed maxillary palps are considered in his work. Our coding for *Octostruma* differs from the count of BOLTON (2003) as a result of the dissection of a specimen of *O. stenognatha* (1-jointed instead of 2-jointed maxillary palps) as already reported in our 1994 paper (p. 19). *Ishakidris* was coded as 2-jointed according to BOLTON (1984) and DIETZ (2004). BOLTON's (2003: 283) record of 3-jointed maxillary palps for this genus is probably due to a typing or printing mistake. Dietz's table 2 contains a number of erroneous codings for this character (e. g. for *Acanthognathus*, *Strumigenys*, *Basiceros*, a. o.).

2. Worker. Labial palps, four-jointed (0), three-jointed (1), two-jointed (2), one-jointed (3). This is character # 9 of BARONI URBANI & DE ANDRADE (1994), char. # 2 of BOLTON (1999) and char. # 8 of DIETZ (2004) (where labial palps are called "palpos mandibulares"). The range of this character is amplified here to include outgroups with four-jointed palps. BOLTON (1999 & 2003) and DIETZ (2004) differ each other in coding this character. In a few doubtful cases that we were unable to examine we recorded the counts of both authors.

3. Worker. Labrum, not T-shaped (0), or T-shaped (1). This is character 3 of BOLTON (1999) but coded polymorphic (instead of never T-shaped) for *Pyramica* because of presence of T-shaped labium in some species like *Pyramica subdentata* (Mayr) (Fig. 1). We coded nonetheless the "T-shaped" structure as regularly present in *Strumigenys* as Bolton did, although the morphology within the genus is far from being unequivocal and constant (Fig. 2).

4. Worker. Labrum capable of full reflexion over the buccal cavity (0), or not (1). This is char. # 4 of BOLTON (1999).

5. Worker. Labral shield not hyperthrophied, not concealing the entire buccal cavity (0), or enormous, hypertrophied, when reflexed concealing entirely the buccal cavity (1). This is char. # 5 of BOLTON (1999). We hesitated to add this character to the matrix since it is logically negatively correlated with character # 4. As a further proof of this, within Bolton's "dacetonine tribe-group" it is distributed among the genera considered in a perfectly complementary way with character # 4, with the sole exception of *Epopostruma*. By considering character # 5, there is hence the risk of overweighting the former char. # 4. Our conclusion is confirmed by

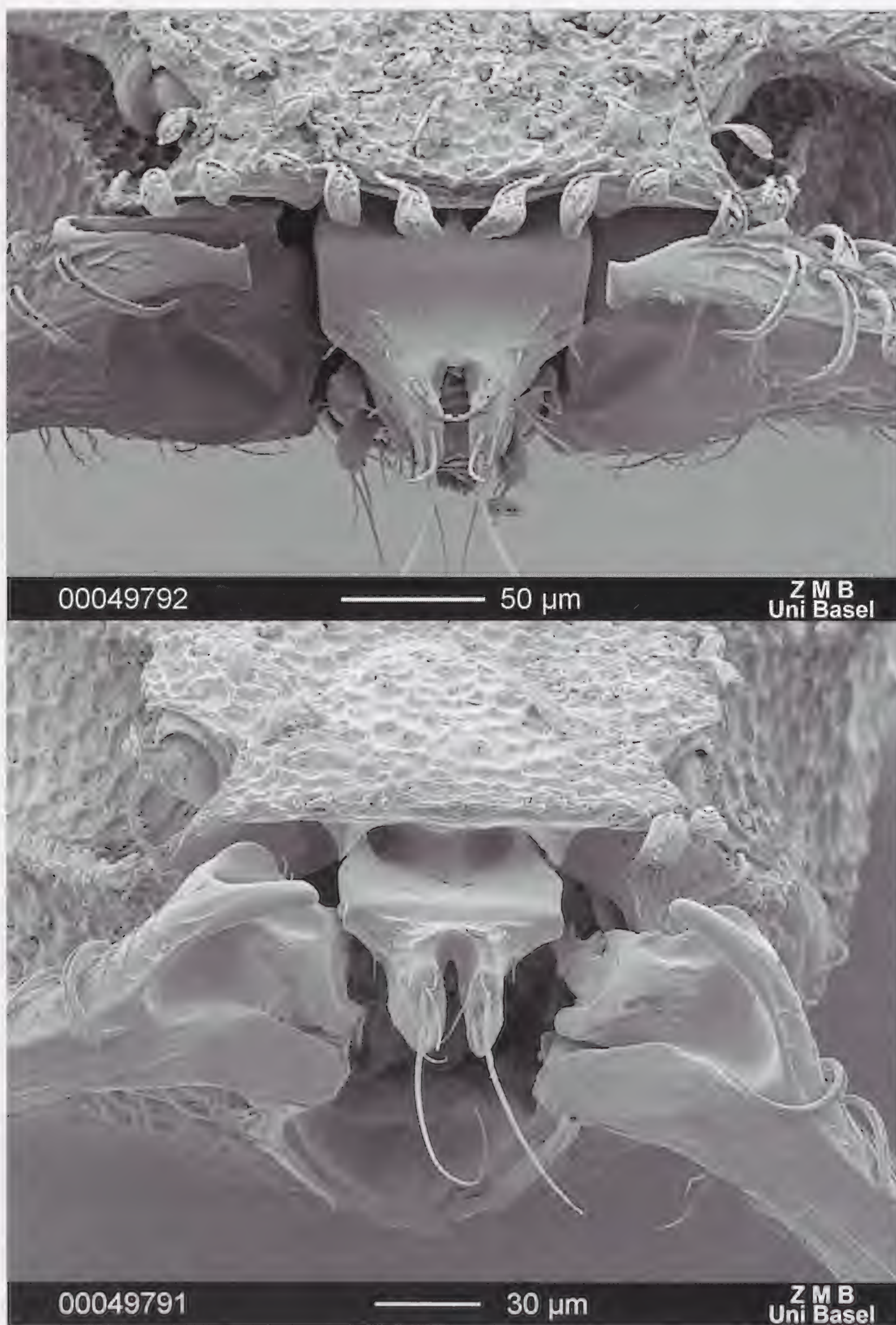


Fig. 1 - "T-shaped labrum" of *Pyramica subdentata* (Mayr), (top) and *Strumigenys exilirhina* Bolton (bottom). The "T-shaped" construction should be synapomorphic for *Strumigenys* and absent in *Pyramica* according to BOLTON (1999, 2000)

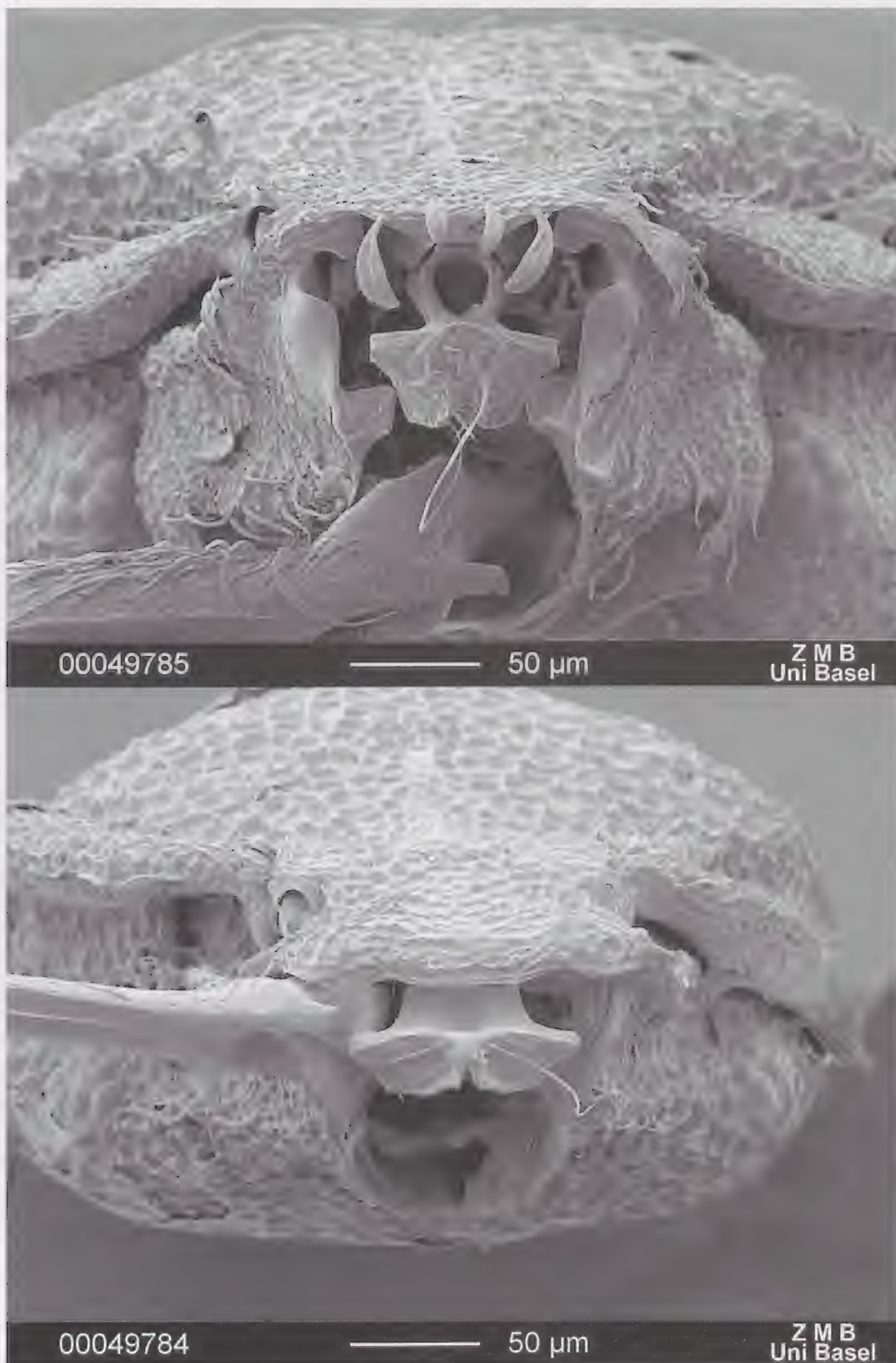


Fig. 2 - Labia of *Strumigenys rogeri* Emery (top) and *S. harpyia* Bolton (bottom) showing intrageneric variation beyond the presumed synapomorphic “T” shape.

examination of BOLTON's (l. c.) character matrix where 0's and 1's are antithetically distributed between characters 4 and 5. One might expect *a priori* that a hypertrophied labrum (char. # 5) should be unable of complete reflexion (char. # 4).

6. Worker. Labrum without (0), or with a deeply incised, transverse groove defined by a sharp ridge (1). Presence of this ridge is given by BOLTON (1998: 70) as synapomorphic for the tribe Basicerotini. The ridge, however, is faint in some Basicerotini species, like *Octostruma stenognatha* Brown & Kempf (Fig. 3) and present in a distantly related genus like *Stegomyrmex*, and in some species of the non-basicerotine ingroups *Pyramica* and *Strumigenys* (Fig. 4), and *Colobostruma* (Fig. 5, bottom).



Fig. 3 - Labrum of *Octostruma stenognatha* Brown & Kempf with superficial (not deeply incised) transversal ridge perfectly comparable to the one of some *Strumigenys* and *Pyramica* of Fig. 4.

7. Worker. Labrum without mid-dorsal impression (0), or with a dorsal impression or pair of impressions (1). This character

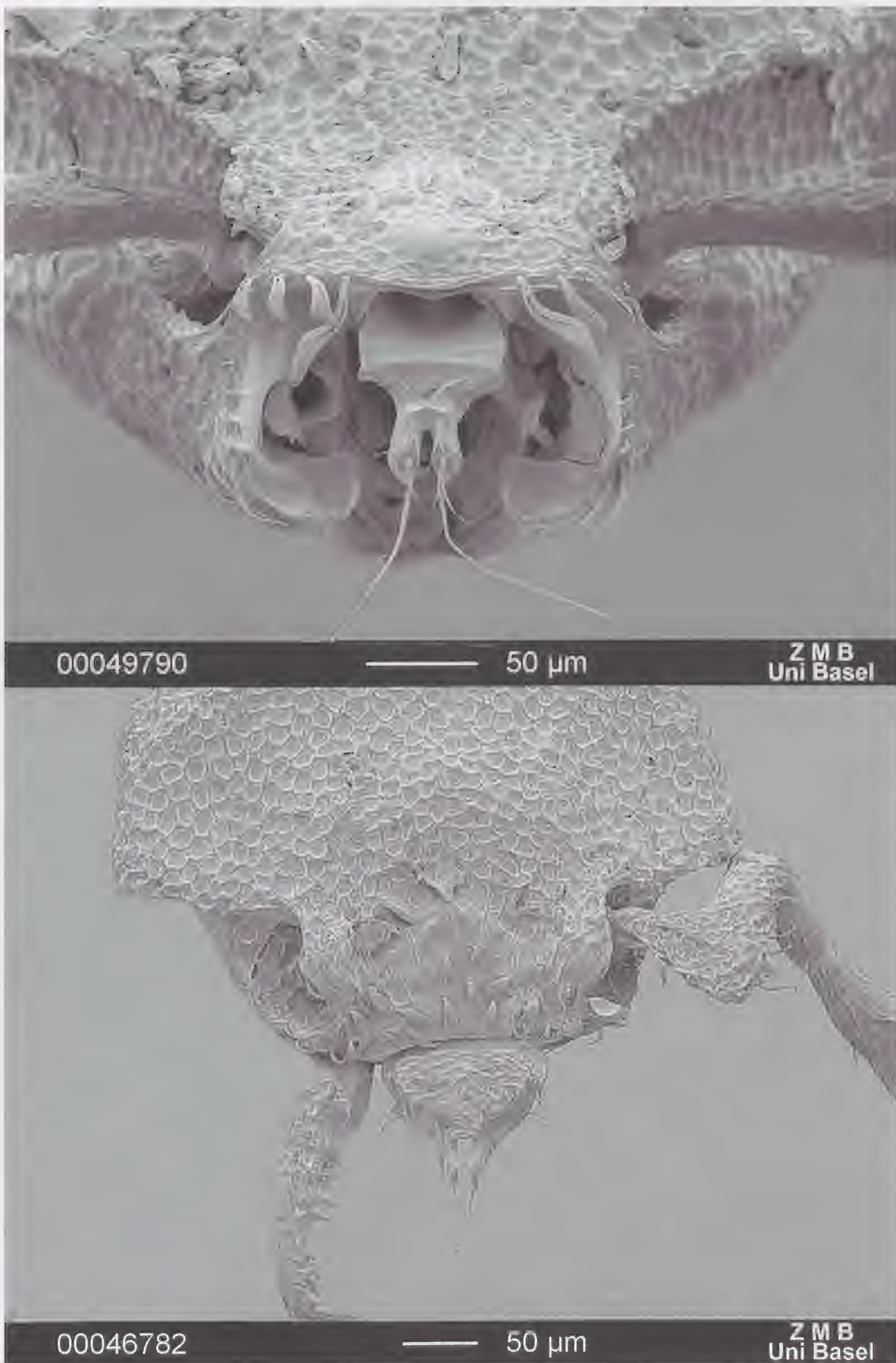


Fig. 4 - Labrum with deeply incised transversal groove, a basicerotine synapomorphy, according to BOLTON (1998) present also among non-basicerotine species, like *Strumigenys elongata* Roger (top) and *Pyramica nannosobek* Bolton (bottom).

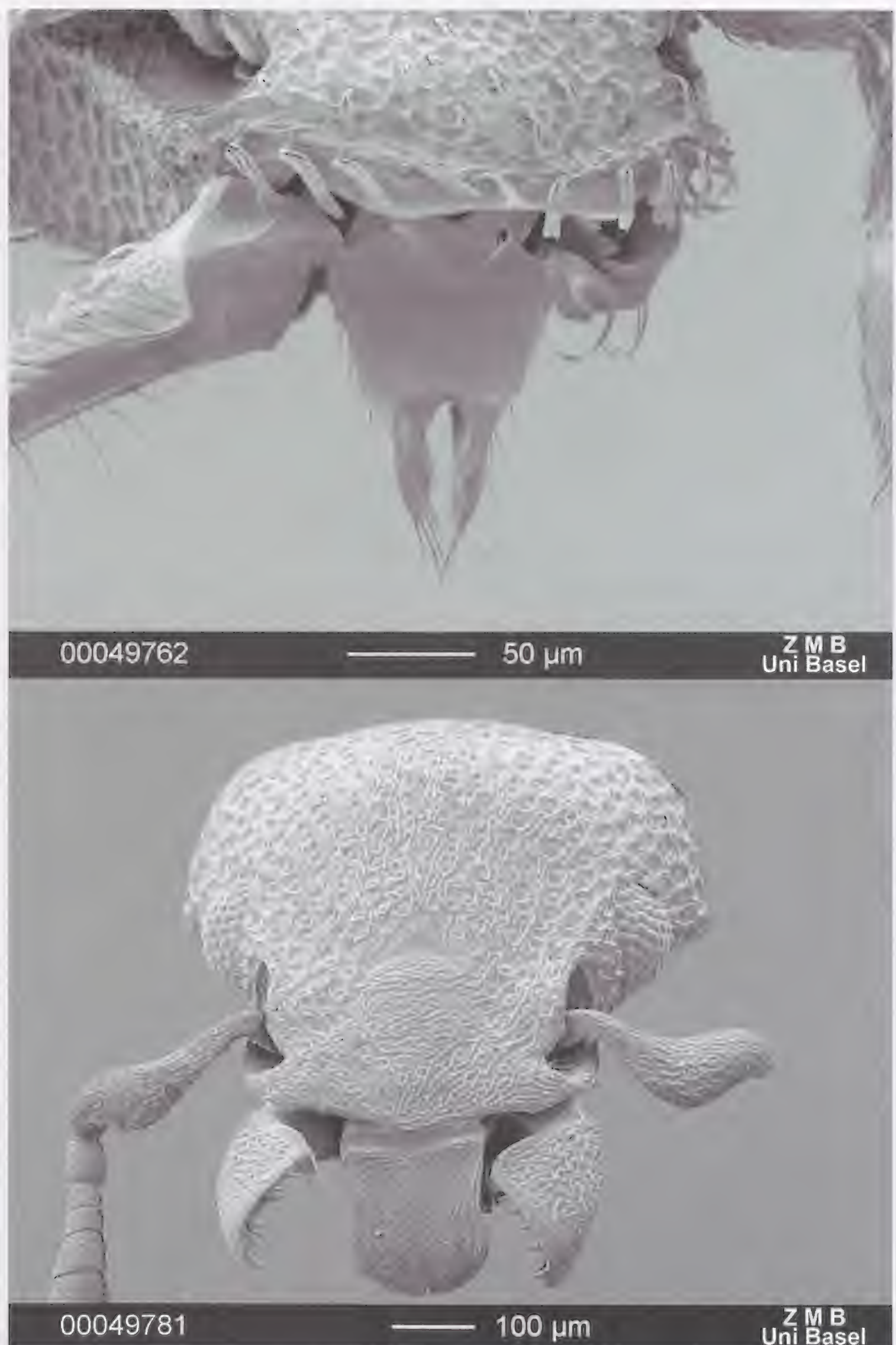


Fig. 5 - Labrum without dorsal impression in some dacetine species. *Pyramica alberti* (Forel) (top) and *Colobostruma sisypha* Shattuck (bottom). Presence of the impression is considered as a dacetine synapomorphy by BOLTON (1998). Notice also the absence of “trigger hairs” (a presumed synapomorphy of all dacetine genera) from the labium of *C. sisypha*.

is given by BOLTON (1998: 72) as uniquely derived for the Dacetini and secondarily lost in *Acanthognathus*. There are no traces of the impression also in the dacetine *Colobostruma* species examined for the present study, and in some *Pyramica* species (Fig. 5, top). We are unable to assess the state of this character in the holotype unique of *Pilotrochus*.

8. Worker. Trigger hairs absent (0), or present (1). The term “trigger hairs”, introduced by BROWN & WILSON (1959) appears to be another “ant term” unknown in entomology textbooks. The hairs described by BROWN & WILSON (l. c.) are obviously hair-shaped mechanoreceptors and we doubt that the peg-like structures of probable chemoreceptor function visible e. g. in most Basicerotini and also drawn e. g. by KEMPF (1960) for *Phalacromyrmex* could be considered as homologous of the former. Presence of “trigger hairs” on the mouthparts should be a synapomorphy of the “dacetone tribe-group” according to BOLTON (1998: 69). Since the myrmecological term “trigger hairs” implies simply response to a stimulus exerted on the ant mandibles without specifying its nature, we try to follow BOLTON (1998) and code uniformly presence of probable chemoreceptor and mechanoreceptor structures on the mouthparts. This same character is used also by DIETZ (2004, character # 6) where it is also coded as universally present among all and only the dacetine genera (s. l.). In our matrix *Pyramica* was coded polymorphic for this character because of the absence or strong reduction of these hairs in some species (Fig. 6). This anomaly is partially admitted also by BOLTON (2000: 178). Some *Colobostruma* species also exhibit no “trigger hairs” (Fig. 5, bottom). Among our outgroups, the clypeal hairs of some *Myrmecia* species (OGATA, 1991) are morphologically indistinguishable from the “trigger hairs” of some dacetines. We coded nonetheless *Myrmecia* as “0” for this character in the (vague) hypothesis that differences in behaviour between *Myrmecia* and dacetines may account also for differences in homology. Moreover, presence of trigger hairs is obviously homologous in function among all ants provided with such hairs but we doubt of its morphological homology when the hairs are located on different sclerites as it is the case for several Dacetini. We thought it necessary formulating this precision but, to reduce confrontation with Mr Bolton on purely academic ground, we coded nonetheless the simple presence or absence of “trigger hairs” as a unique dacetine tribal

group character as Bolton and Dietz did. At least patent absence of “trigger hairs” of any kind, of course, was recorded as absence.

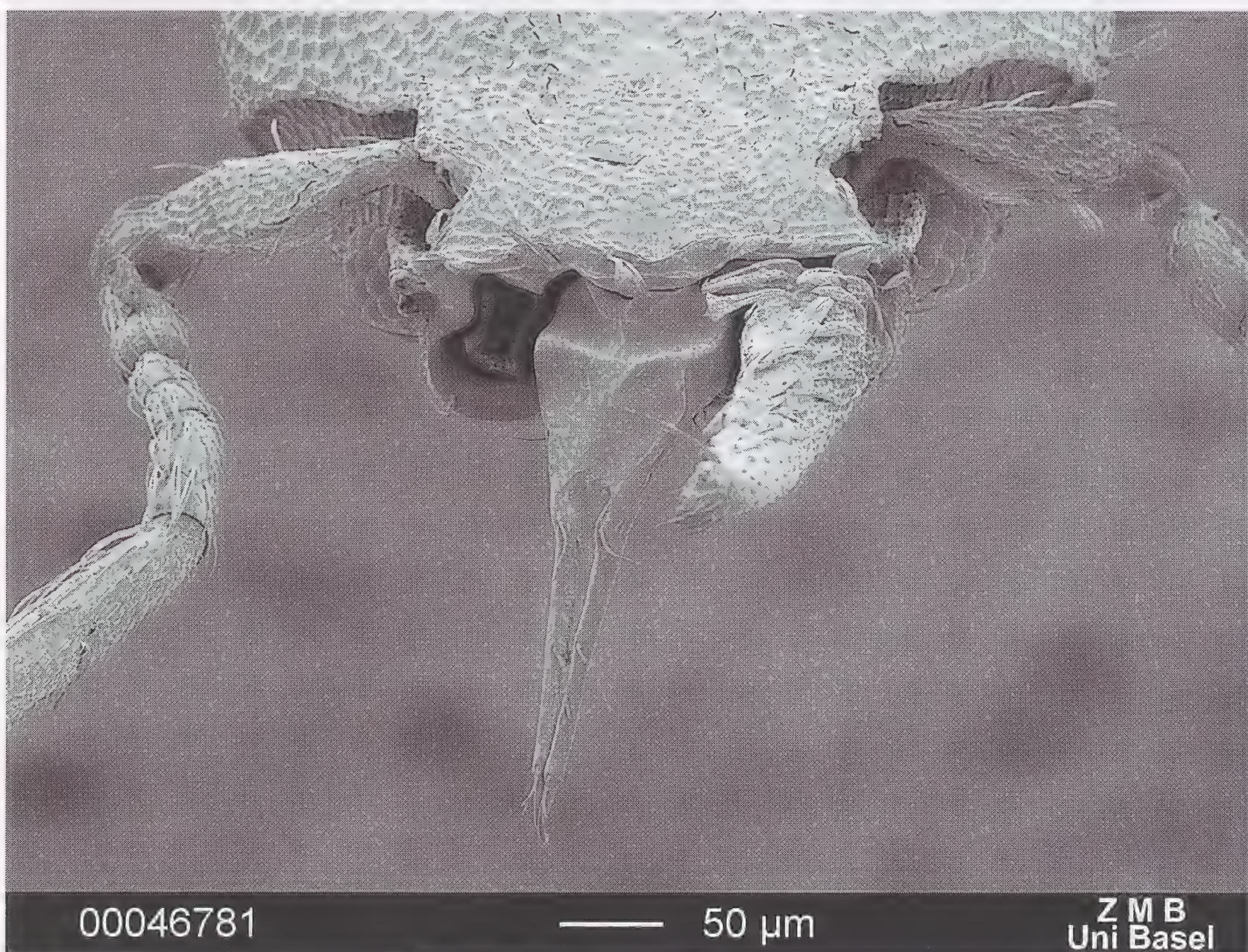


Fig. 6 - *Pyramica myllorhapha* (Brown) without morphologically differentiated “trigger hairs” on the mouthparts. Presence of “trigger hairs” is considered as a synapomorphy of his “dacetonine tribe group” by BOLTON (1998 & 1999).

9. Worker. Mandibles at rest crossing (0) or crossing in their distal part of the masticatory border and opposing in the basal one (1), or opposing on their whole border (2). State 2 is the synapomorphy of the Dacetini (s. l.) according to BARONI URBANI & DE ANDRADE (1994) (character # 6) and of the “dacetonine tribe-group” of BOLTON (1998: 67) and DIETZ (2004, character # 1). Acceptance of the meaning of this character might propose re-inclusion of the Sicilian Miocene *Hypopomyrmex bombicci* EMERY, 1891, among the Dacetini (see e. g. Emery’s Table 1, Fig. 11). This latter hypothesis was not tested in the following due to the poor preservation conditions of the sole known *Hypopomyrmex* specimen. BARONI URBANI & DE ANDRADE (1994), misinterpreting a figure by KEMPF (1960), con-

sidered as entirely opposing also the mandibles of *Phalacromyrmex*. This is erroneous as shown by a more careful scrutiny of Kempf's figure and by the examination of the holotype and paratype of *Ph. fugax*. BOLTON (1998) and DIETZ (2004) repeated nonetheless the same error. The *Pilotrochus* holotype appears to exhibit a condition very similar to the one of *Phalacromyrmex*. For this reason, we thought it better to code both genera as state "1", intermediate between the crossing and opposing conditions. Moreover, in spite of the presumable hierarchic importance of this character, it is not clear which one should be the formicid plesiomorphic condition. The mandibles are able of both, crossing and opposing in the unspecialized ant genus *Prionomyrmex* and among wasps, the sister family of ants.

10. Worker. Mandibles engaging through most of their length (0), or only apically (1). This is char. # 7 of BARONI URBANI & DE ANDRADE (1994) and character # 7 of BOLTON (1999). Polymorphism in *Strumigenys* added here in consideration of *Strumigenys guttulata* Forel as described by BOLTON (2000: 976, explicit description, and Fig. 530, illustration) and *S. horvathi* Emery (present study). DIETZ (2004) does not consider this structure for his phylogenetic analysis. The reason for it – we believe – lies in the fact that this character is polymorphic among some genera like *Octostruma* (see e. g. DIETZ's l. c. Figs. 27 A and C). In our matrix, *Octostruma* and other genera where we observed polymorphism are consequently coded as polymorphic for this character. *Rhopalothrix* should be coded as polymorphic for this character after transfer to it of *Eurhopalothrix bruchi* (Santschi) as suggested by DIETZ (2004: 200). Our examination of the 5 specimens representing the type series of *bruchii* does not support Dietz's conclusion. The mandibular morphology represents well an average *Eurhopalothrix* and both mandibles at rest engage through most of their length. The distribution of this character is perfectly equivalent to Dietz's character # 9 (forma das mandíbulas: triangulares ou especializadas) since the shape of the mandibles is just another expression of their capacity to engage each other. Our coding differs nonetheless from the one of DIETZ (l. c.) for *Colobostruma* and *Mesostruma* whose mandibles engage through most of their length and where we see no traces of specialization.

11. Worker. Mandibles normally toothed (0), or with alternating small and large teeth (1). This, according to BOLTON (1998: 72) and DIETZ (2004, character # 10) is a synapomorphic trait of the genera of the tribe Phalacromyrmecini. Alternating small and large teeth, however, are present also in *Pyramica bunki* (Brown) (BOLTON, 2000, Fig. 113), *Pyramica kichijo* (Terayama, Lyn & Wu), *Octostruma betshi* Perrault (PERRAULT, 1988: Fig. 2), and *Octostruma balzani* (Emery) from Ecuador (Fig. 7) equally exhibit teeth alternating in size. Since the tribe Phalacromyrmecini comprises only three monotypic genera, this presumed tribal character is present in three phalacromyrmecines and at least in four, closely related, but non-phalacromyrmecine species. BARONI URBANI & DE ANDRADE (2006a) already called the attention on these species not fitting Bolton's classification but BOLTON (2006a) states that the cases above are not comparable to the phalacromyrmecine morphology because of minute differences and because the *Pyramica* species have a basal lamella (see also our discussion of the lamella under character # 13). One cannot consider the mandibular dentition and the lamella as two independently derived characters (as Bolton and ourselves did to construct our phylogenies) and use one of the two characters as an attribute of the other as did BOLTON (2006a). BOLTON (2006a) blames our use of the dentition without considering presence or absence of the lamella but our way is the sole correct way of considering both structures as independently derived characters and hence of using both characters in phylogenetic studies. As far as the morphological differences in dentition are concerned, we must admit that probably there are no two ant teeth looking exactly the same, but to see a phylogenetic meaning in details of the magnitude of those used by Bolton, to use Bolton's words, one needs to be cleverer than "other mere mortals".

12. Worker. 2-3 apical mandibular teeth overlapping (0), or interlocking (1). This is char. # 8 of BOLTON (1999). In addition to the distribution of this character as given by Bolton (l. c.), the apical teeth interlock also in a number of *Strumigenys* (among other possible examples, *S. percrypta* Bolton (BOLTON, 2000, Fig. 375) and *S. rogeri* Emery (BOLTON, 2000, Fig. 368)) and *Pyramica*, like *P. vartana* Bolton (BOLTON, 2000, Fig. 135) species (see also our Fig. 8 for additional examples encountered during the present study).

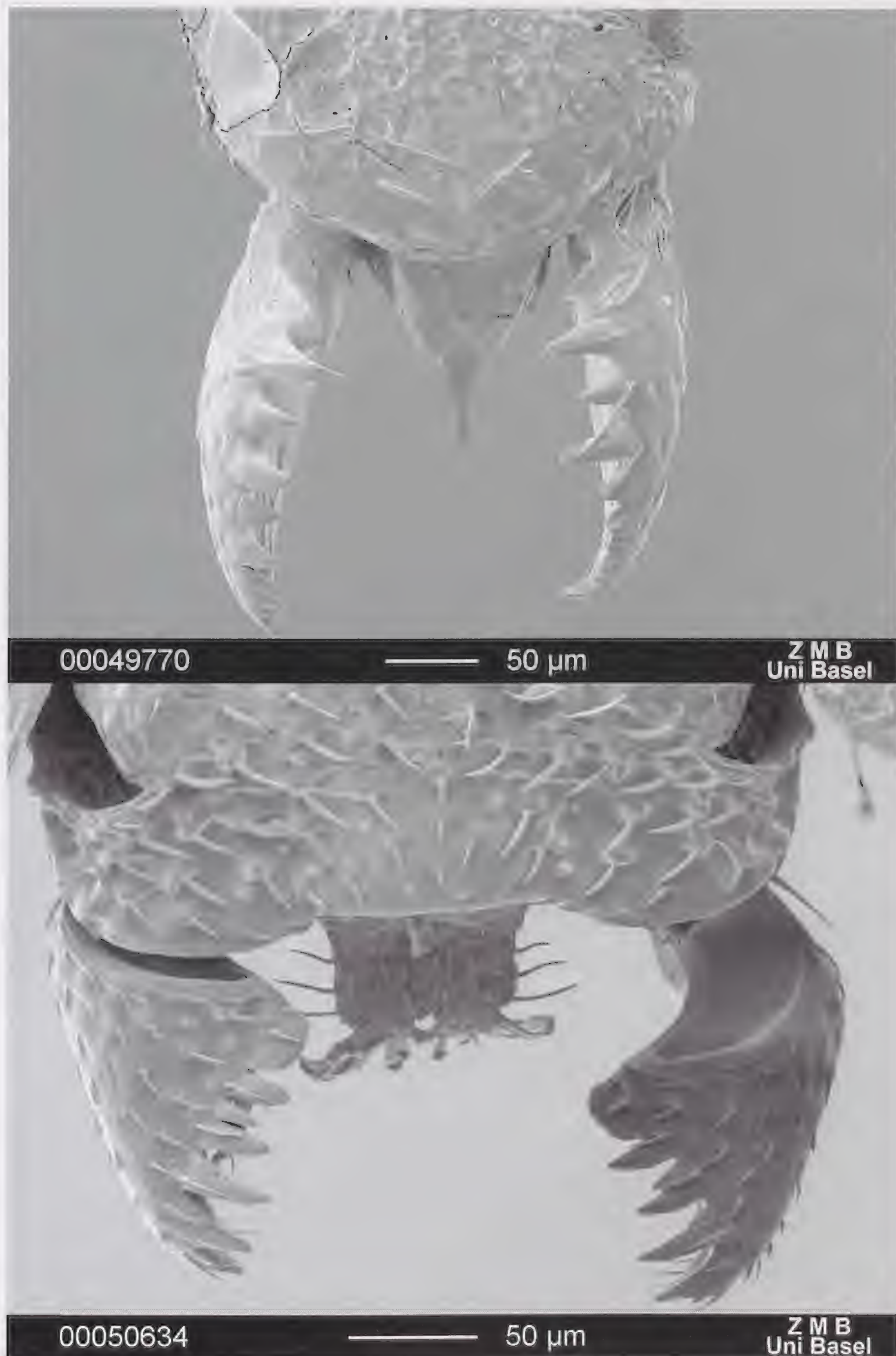


Fig. 7 - *Pyramica kichijo* Terayama, Lin & Wu (Dacetini) (top) and *Octostruma balzani* (Emery) from Yasuní, Ecuador (Basicerotini) (bottom). Mandibles with alternating large and small teeth. Mandibular teeth alternating in size is considered as a phalacromyrmecine synapomorphy by BOLTON (1998).

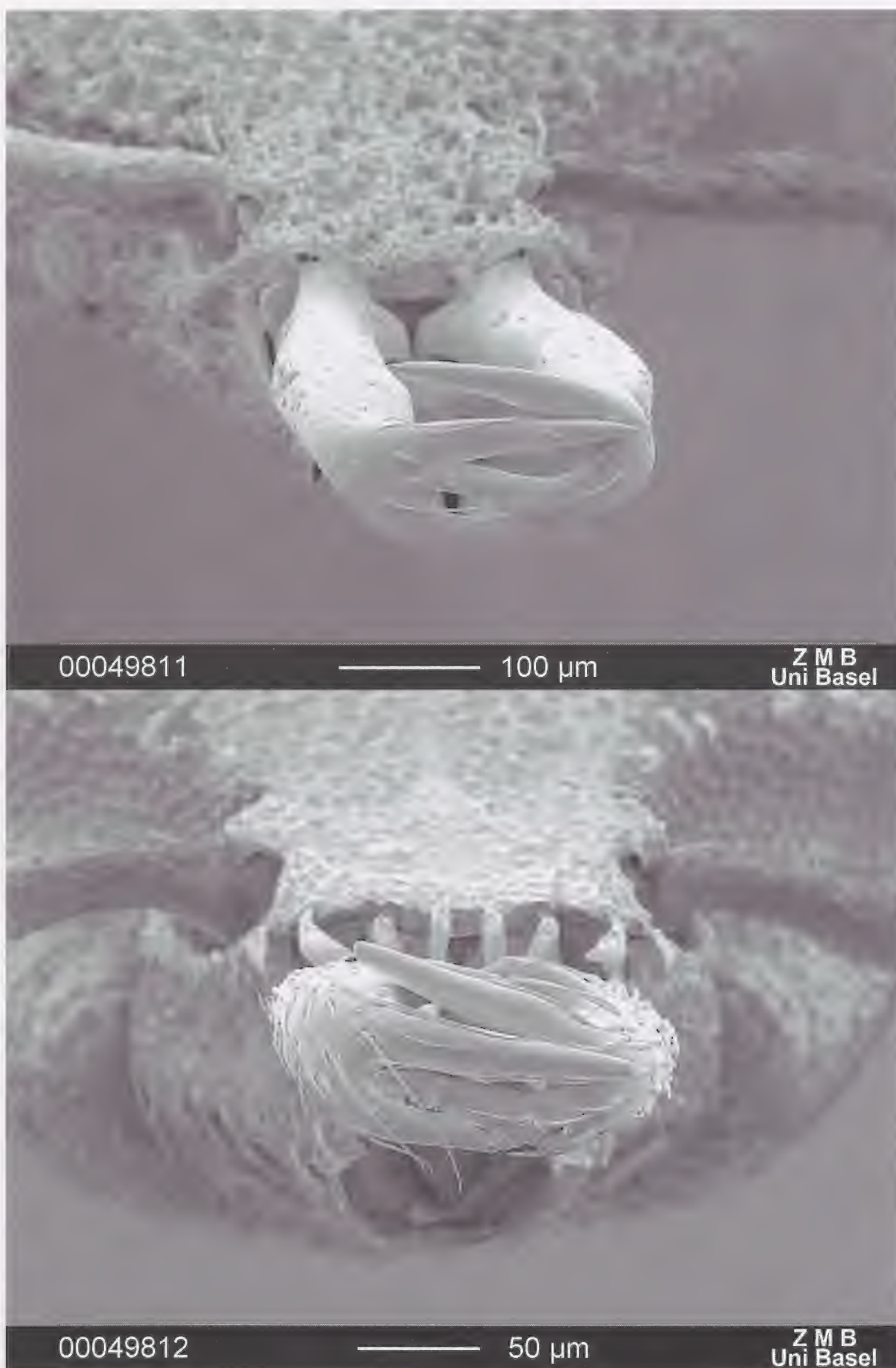


Fig. 8 - *Strumigenys doriae* Emery (top) and *S. rogeri* Emery (bottom). Mandibles with apical teeth interlocking (not interlocking according to the table of BOLTON, 1999).

13. Worker. Basimandibular process absent (0), or present but not bifurcated (1), or present, long and apically bifurcated (2). This character results from merging chars. # 9 of BOLTON (1999) (= char. # 13 of DIETZ, 2004, i.e. presence or absence of the basimandibular process) and char. # 10 of BOLTON (1999) (i.e. basimandibular process round and thick vs. a spur, dentiform, or lamellate). We decided to merge Bolton's two characters in one because A) the variation in shape that we observed is difficult to reduce to Bolton's two binary categories (Fig. 9), and, B) Bolton's coding of his character # 10 as autapomorphic for *Daceton* renders it cladistically uninformative. Our coding might still need to be further modified in the future since an apparent basimandibular process is present also among most Basicerotini, *Stegomyrmex*, *Tatuidris* and *Calypatomyrmex*. This reality is admitted only in part by BOLTON (1998: 72) who states "Basicerotine species with a modified basal tooth are exceptional and certainly best regarded as independent acquisitions". We follow hence BOLTON (l. c.) and code the basimandibular process as absent among the Basicerotini in our matrix. Additionally, at least in some dacetine species currently classified in *Pyramica*, like *P. argiola* (Emery) and *P. nannosobek* Bolton (Fig. 10) the process is so reduced to be barely distinguishable or invisible. Note that *P. argiola* is one of the species dissected by BOLTON (1998) to define his Dacetonin but no mention to the absence of basimandibular tooth is made in this paper. Analogously BOLTON (2000:12) defines the Dacetini as unequivocally characterized by the presence of the lamella. Only in a different context, i.e. in the species-level discussion he admits (page 286) that in the *argiola*-group the lamella is "small, dentiform to low triangular and inconspicuous" (description which we regard as exaggerated if compared with the morphology visible in Fig. 10), in the *murphyi*-group is "reduced to a very narrow stripe not visible in full face view", and in the *mnemosyne*-group is "minute to vestigial, at most a mere ridge on the margin". BOLTON (2006b) regards his former (insufficiently) reductive statements as a clear argument in favour of the validity of the basal lamella as a tribal character. We would consider it as a proof of the contrary but followed nonetheless BOLTON (1999, 2003) in coding the process as uniformly present in *Pyramica* and considering these previously neglected cases as secondary losses of the process as suggested by the presence of its remnants, though we are not always sure to

be able to see such remnants. BOLTON (2006a) states that absence of the lamella in the closely related "Phalacromyrmecini" is "presumably plesiomorphic". We don't see the difference with the very similar condition of *Pyramica argiola*, *nannosobek*, etc. cited above, unless one already has in mind his own favourite phylogeny instead of trying to construct the most probable one. But even BOLTON (l.c.) apparently notices the contradiction and tries to avoid it by calling the previous exceptions to his general rule "a few documented cases of obvious secondary reduction or modification of function". We never saw these documents. In favour of our point of view we must notice also that BOLTON (1988:71), while reviving his Dacetini s. str. (under the name Dacetonini), emphasizes the importance of the basimandibular process without mention of "cases of obvious secondary reduction". On the internal margin of the mandibles of *Phalacromyrmex fugax* there is a small, denticulate swelling. We find it difficult to consider this structure as a typical example of absence of the lamella in *Phalacromyrmex* and the morphology e.g. of *Pyramica argiola* (Fig. 10) as a documented demonstration of secondarily 'lost presence' of it. The bifurcated condition of the lamella is a classic, undoubted autapomorphy for *Acanthognathus*.

14. Worker. Basimandibular seta absent (0), or present (1). This is a potential synapomorphy for Basicerotini and Phalacromyrmecini in BOLTON (1998: 73) and is coded as such by DIETZ (2004, character # 4). Actually a basimandibular seta is present also in *Stegomyrmex* and in some *Strumigenys* and *Pyramica* species (Figs. 11, 12 & 13), though in the latter two genera the position of the seta is slightly more distal than in *Stegomyrmex* and Basicerotini.

15. Worker. Number of antennal joints: 11-12 (0), or less than 11 (1). This is char. # 4 of BARONI URBANI & DE ANDRADE (1994), character # 11 of BOLTON (1999) and char. # 20 of DIETZ (2004), coded in binary form as already done by BOLTON (1999) and DIETZ (2004). There is increasing consensus on the poor phylogenetic value of the dacetine antennal count variation. Already BOLTON (1983) concluded "the reduction in antennomere count has little or no value at genus level...". Experimental attempts of cladistic analyses in which the actual antennal counts were given for each genus and considered as unordered, ordered, "Dollo", or irreversible, regularly yielded very implausible phylogenetic reconstructions. We agree with BOLTON (l.c.) that polarization of two states at the extremes of

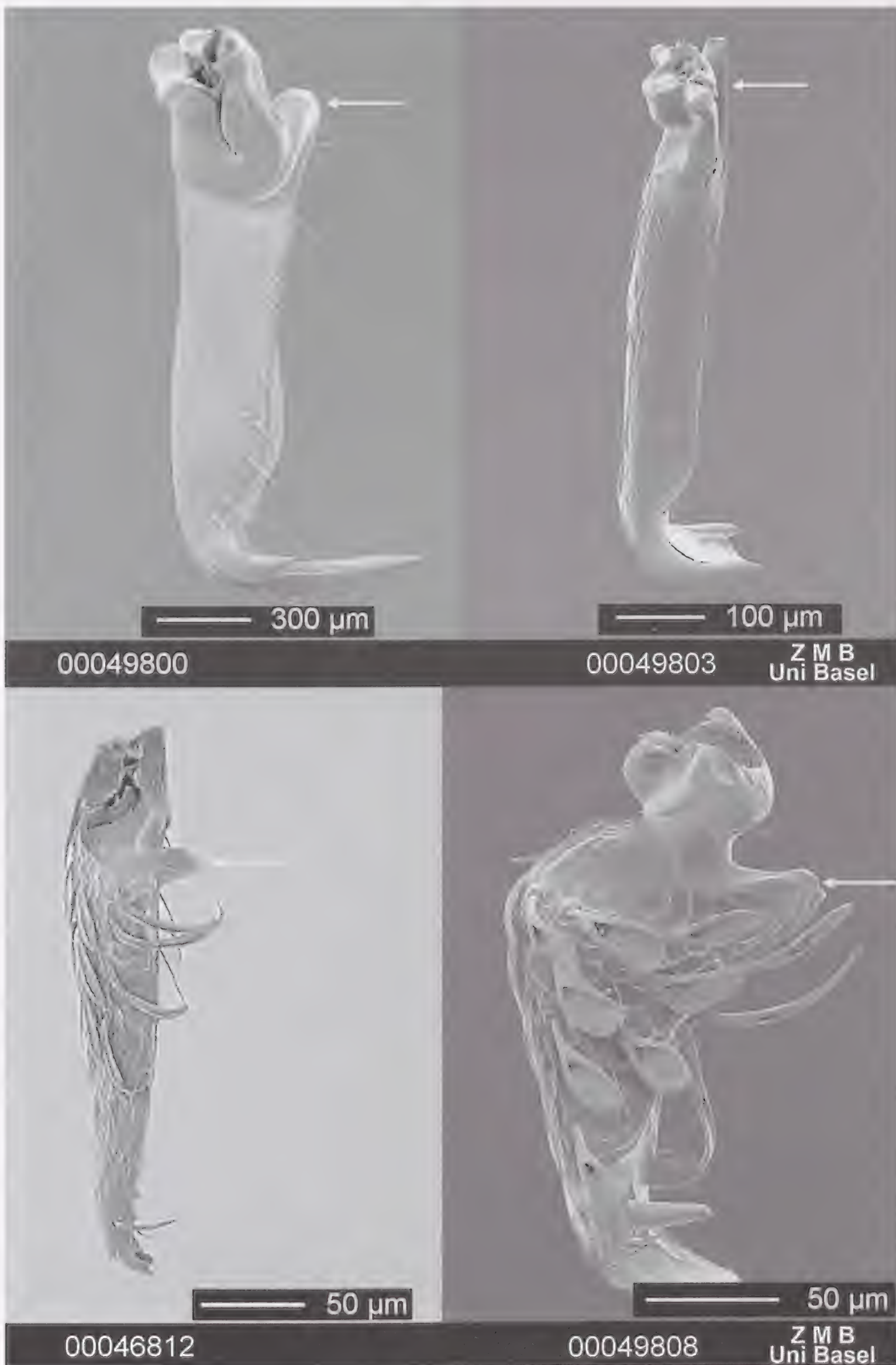


Fig. 9 - Variability of the basimandibular process among some dacetine ants. *Daceton armigeron* (Perty) (top left), *Strumigenys micretes* Brown (top right), *Pyramica zeteki* (Brown) (bottom left), *Strumigenys lyroessa* (Roger) (bottom right).

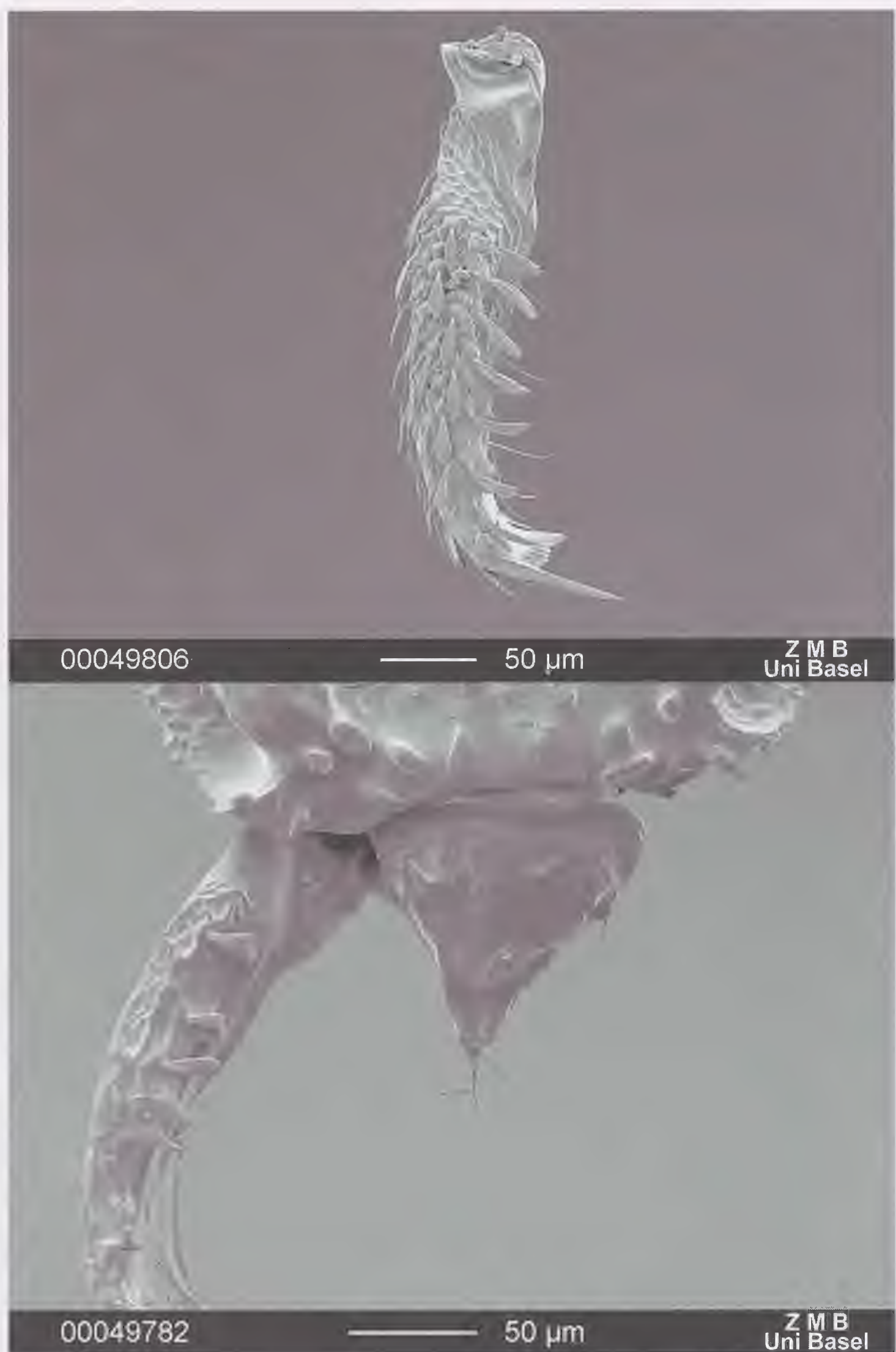


Fig. 10 - *Pyramica argiola* (Emery) (top) and *P. nannosobek* Bolton (bottom) with basimandibular process barely distinguishable or absent. *P. argiola* has no visible process but it shows two internal longitudinal ridges, which could be both interpreted as a remnant of the basimandibular process. Presence of the process or of its or remnants should be synapomorphic for the tribe Dacetini according to BOLTON (1999, 2003).

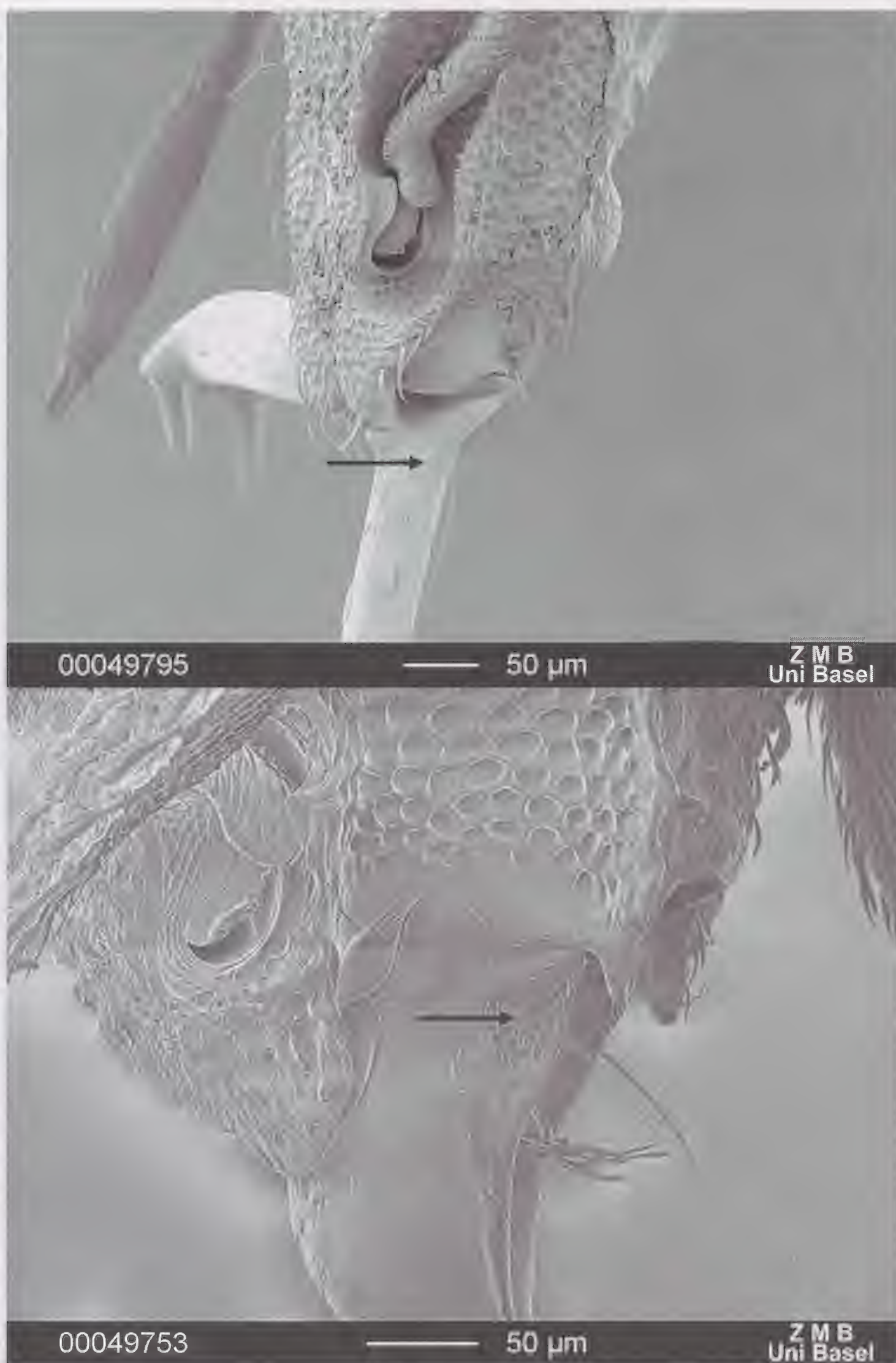


Fig. 11 - *Strumigenys paranetes* Brown (top) (Dacetini) and *Octostruma* nr. *batesi* (Emery) (Basicerotini) (bottom) showing the basimandibular seta (pointed by the arrow). Presence of the seta should be synapomorphic for the tribe Basicerotini according to BOLTON (1998).

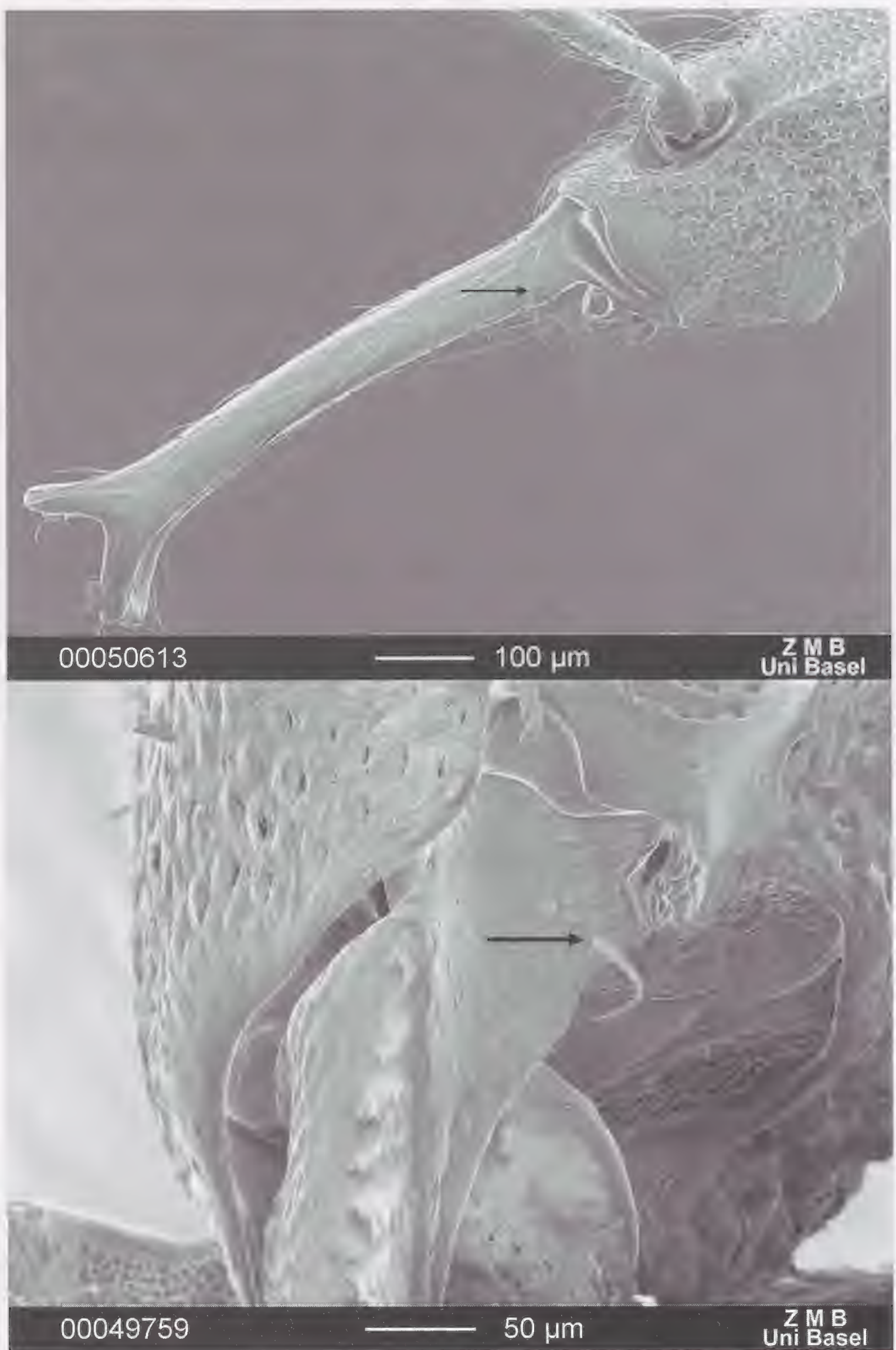


Fig. 12 - *Strumigenys gloriosa* Bolton. (Dacetini) (top) and *Eurhopalothrix platisquama* Taylor (Basicerotini) (bottom) showing the basimandibular seta (pointed by the arrow). Presence of the seta should be synapomorphic for the tribe Basicerotini according to BOLTON (1998).



Fig. 13 - *Pyramica denticulata* (Mayr) (Dacetini) (top) and *Stegomyrmex vizottoi* Diniz (Stegomyrmecini) (bottom) showing the basimandibular seta (pointed by the arrow). Presence of the seta should be synapomorphic for the tribe Basicerotini according to BOLTON (1998).

the sole known gap (10 antennomeres) among the ants considered in the present study appears the most reasonable way of considering this character.

16. Worker. Two-segmented antennal club absent or indistinct (0), or well developed (1). This is char. # 12 of BOLTON (1999) and a simplification of BARONI URBANI & DE ANDRADE's (1994) character # 5.

17. Worker. Scape straight at base (0), or gently downcurved at base (1). This is char. # 14 of BOLTON (1999).

18. Worker. Base of scape straight or at least complanar with basal condyle (0), or scape bent at right angle near the base (1). The curved or angular scape is a synapomorphy of the Basicerotini according to BOLTON (1998: 71). Separating this character from the previous one might need some dialectic exercise. We kept the two separate because of the presumed important phylogenetic meaning of the latter if the independent evolution of the two traits will be confirmed. Examples of non-basicerotine species exhibiting the basicerotine condition are *Pyramica decipula* (Bolton), *Pyramica nanosobek* Bolton (Figs. 14 & 15) and *Colobostruma froggatti* (Forel) (partially visible in Fig. 38). If we understand properly DIETZ (2004) this character should be equivalent or very similar to his character # 22 but we are unable to verify his recording for different taxa. In spite of differences in definition and coding, we did not consider DIETZ (l. c.) as referring to another, different character since we already fear that consideration of our characters 17, 18 and 19 could overweight the shape of the scape within our data.

19. Worker. Scape not clavate (0), or clavate (1). Presence of a clavate scape is given by BOLTON (1998: 72) and DIETZ (2004, chars. # 21 and # 23) as synapomorphic for the tribe Phalacromyrmecini. We are unable to see differences between the descriptions of DIETZ's char. # 21 "Clava da antena: ausente (0); presente (1). A clava é um alargamento do escapo...estrutura distinta e característica...da tribo Phalacromyrmecini" and char. # 23 "Escapo clavado: não clavado (0); clavado (1)". Differences, however, are impressive within their respective coding by DIETZ (l. c.). According to our observations, a clavate scape, in addition than in the Phalacromyrmecini, is present also in *Stegomyrmex*, *Tatuidris*, in *Pyramica warditera* Bolton (BOLTON, 2000, Fig. 165) and *P. reticeps* (Kempf) (BOLTON, 2000,

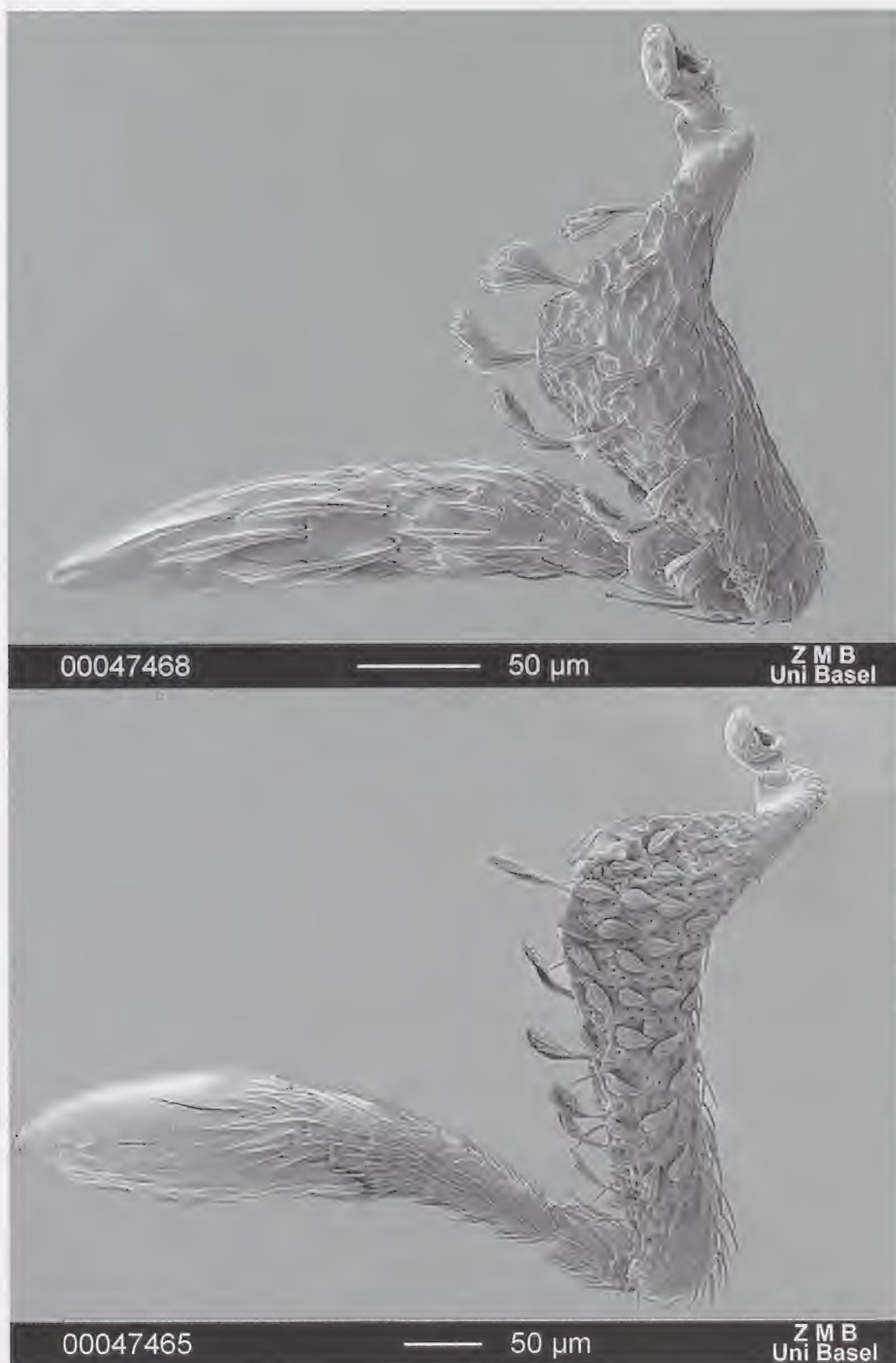


Fig. 14 - Inadequacy of the scape shape as a tribal character for the Basicerotini. Example 1. Morphological similarity between *Pyramica decipula* (Mayr) (Dacetini) (top) and *Rhopalothrix ciliata* Mayr (Basicerotini) (bottom).

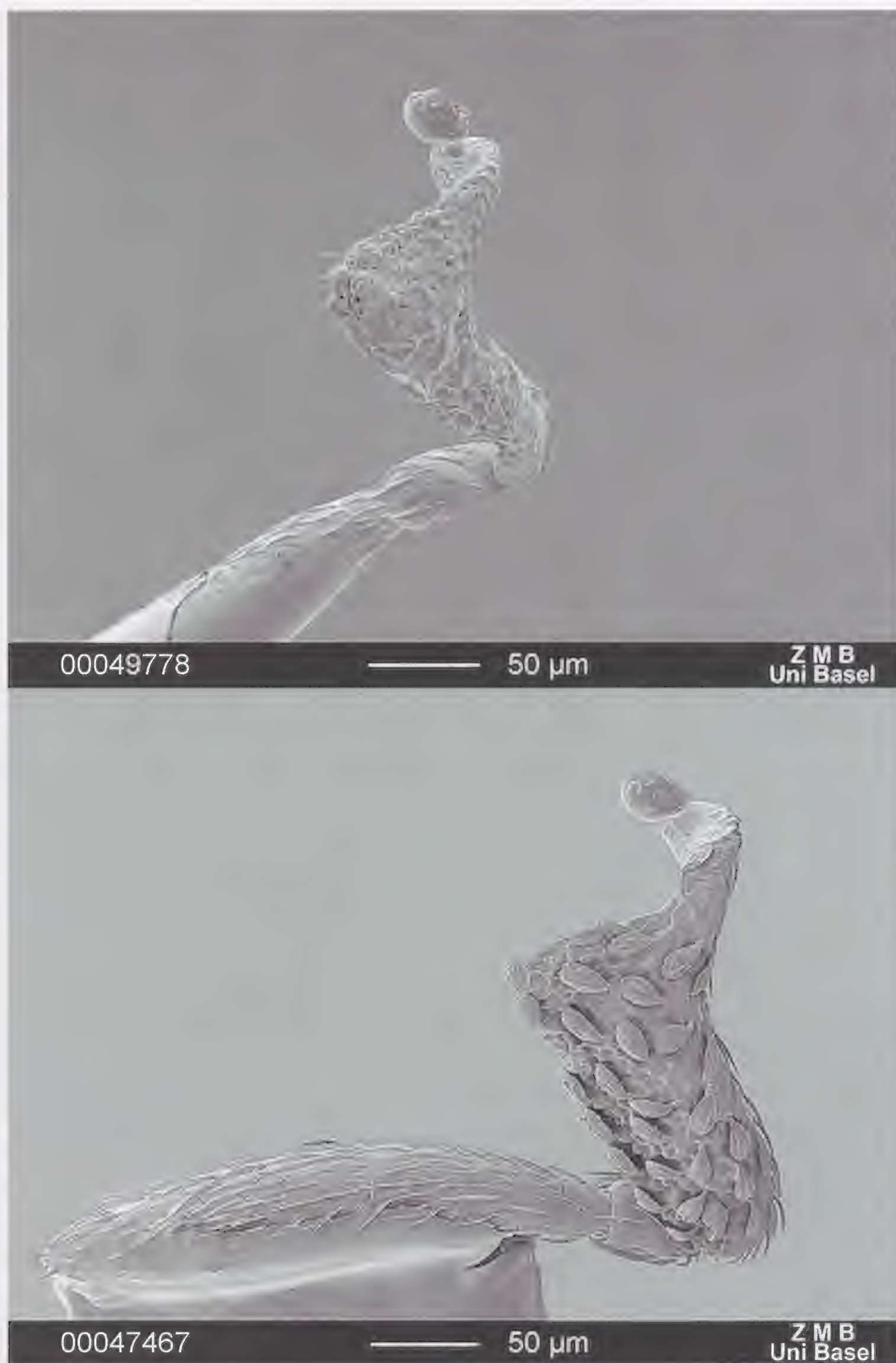


Fig. 15 - Inadequacy of the scape shape as a tribal character for the Basicerotini. Example 2. Morphological similarity between *Pyramica nannosobek* Bolton (Dacetini) (top) and *Eurhopalothrix bruchi* (Santschi) (Basicerotini) (bottom).

Fig. 162). We are unable to explain DIETZ's explicit reference to the Phalacromyrmecini for his character # 21 (p. 32) and his recording of this character in his table 2. In this table the clavate scape is given as unknown in *Phalacromyrmex* and present in a number of non-phalacromyrmecine genera like the Attini, *Platythyrea*, *Stegomyrmex*, *Blepharidatta*, *Microdaceton*, *Daceton*, *Orectognathus*, *Colobostruma*, *Mesostruma*, *Epopostruma*, *Pyramica*, *Strumigenys*, *Basiceros*, *Eurhopalothrix*, *Octostruma*, *Protalaridris*, *Rhopalothrix*, *Talaridris*. See also our worries about redundancy of the scape characters expressed under our description of character 18.

20. Worker. Torulus simple or with a small lobe at most (0), or with hypertrophied dorsal lobe and strongly curved downwards (1). This is given by BOLTON (1998: 70) and by DIETZ (2004, char. # 15) as a synapomorphy of the Basicerotini. A hypertrophied torulus, however, is present also in *Tatuidris*, *Mesostruma eccentrica* Taylor, *M. bella* Shattuck, *Colobostruma alinodis* (Forel), and in some *Strumigenys* and *Pyramica* species (Figs. 16 & 17).

21. Worker. Second funicular joint normal (0), or hypertrophic (1). This is a clear autapomorphy for *Orectognathus*.

22. Worker. Antennal fossa and scrobe (when present) confluent (0), or separated from each other by at least a cuticular rim or crest (1). This is another basicerotine synapomorphy according to BOLTON (1998: 71) and DIETZ (2004, char. # 16). The crest is indistinct in some *Eurhopalothrix* species like *E. bruchi* (Santschi) (Fig. 16, top) and *E. heliscata* Wilson & Brown (Fig. 18, top). On the contrary, a distinct crest is visible in some *Pyramica* and *Strumigenys* species (Fig. 18, bottom). A number of Dacetini species have been already illustrated by Bolton with photographs showing the presumed basicerotine structure in these non-basicerotine genera (see e. g. BOLTON, 2000: Figs. 352, 483, 516 for *Strumigenys*; BOLTON, 1999: Fig. 60 and BOLTON, 2000: Figs. 236, 241 for *Pyramica*; and BOLTON 2000: Fig. 46 for *Colobostruma sisypha* Shattuck).

23. Worker. Antennal scrobe absent (0), present and above the eyes (1), present and below the eyes (2), or with the eyes at its posterior border (3). This is character # 2 of BARONI URBANI & DE ANDRADE (1994) where it was coded as two-states only, character # 16 of BOLTON (1999) and character # 18 of DIETZ (2004) with addition of state 3 (present study). Character state 3 was added here in



Fig. 16 - Inadequacy of the torulus shape as a tribal character for the Basicerotini. Example 1. Morphological similarity between *Eurhopalothrix bruchi* (Santschi) (Basicerotini) (top) and *Strumigenys godmani* Forel (Dacetini) (bottom).

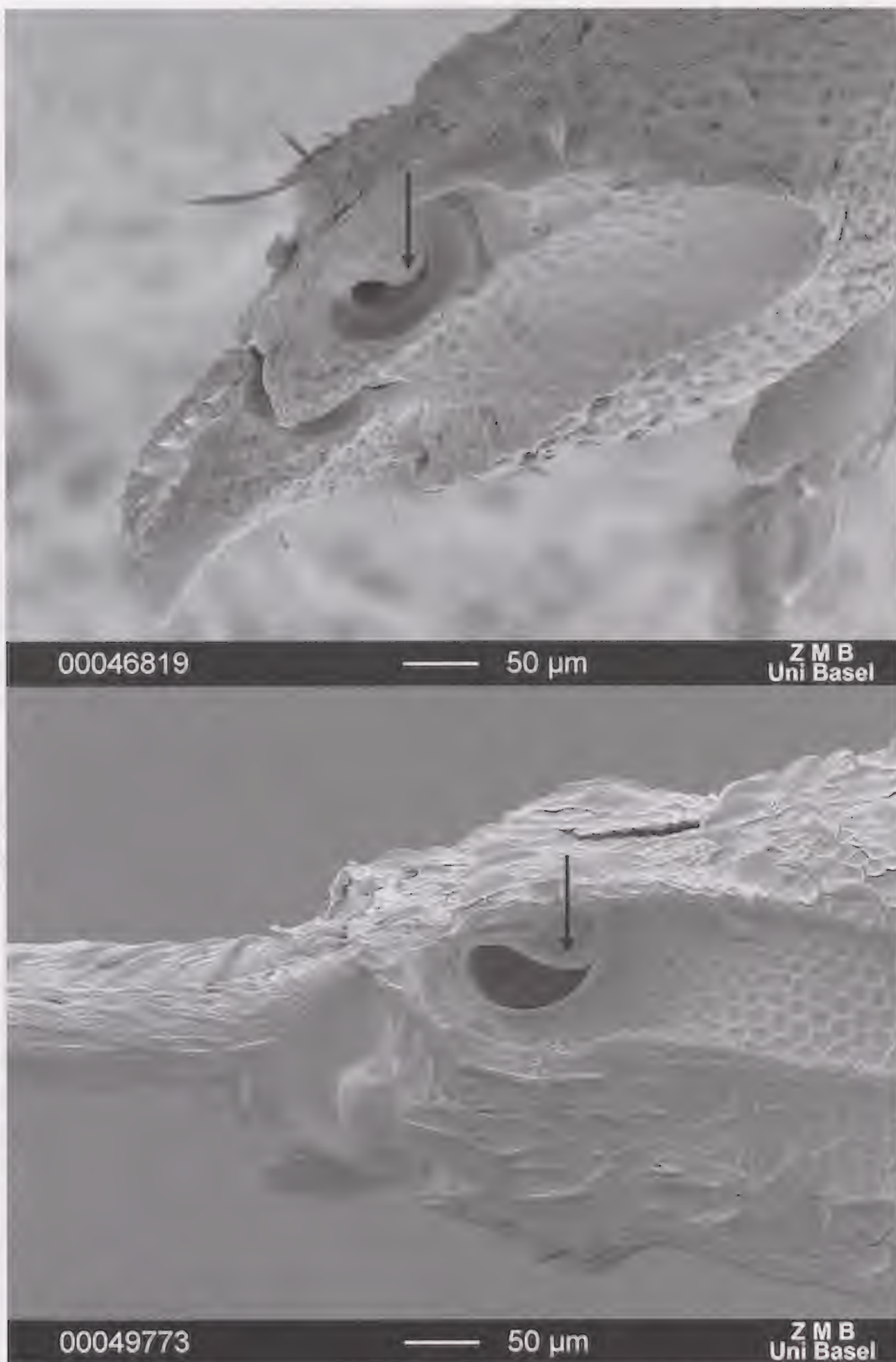


Fig. 17 - Inadequacy of the torulus shape as a tribal character for the Basicerotini. Example 2. Morphological similarity between *Octostruma betschi* Perrault (Basicerotini) (top) and *Strumigenys micretes* Brown (Dacetini) (bottom).

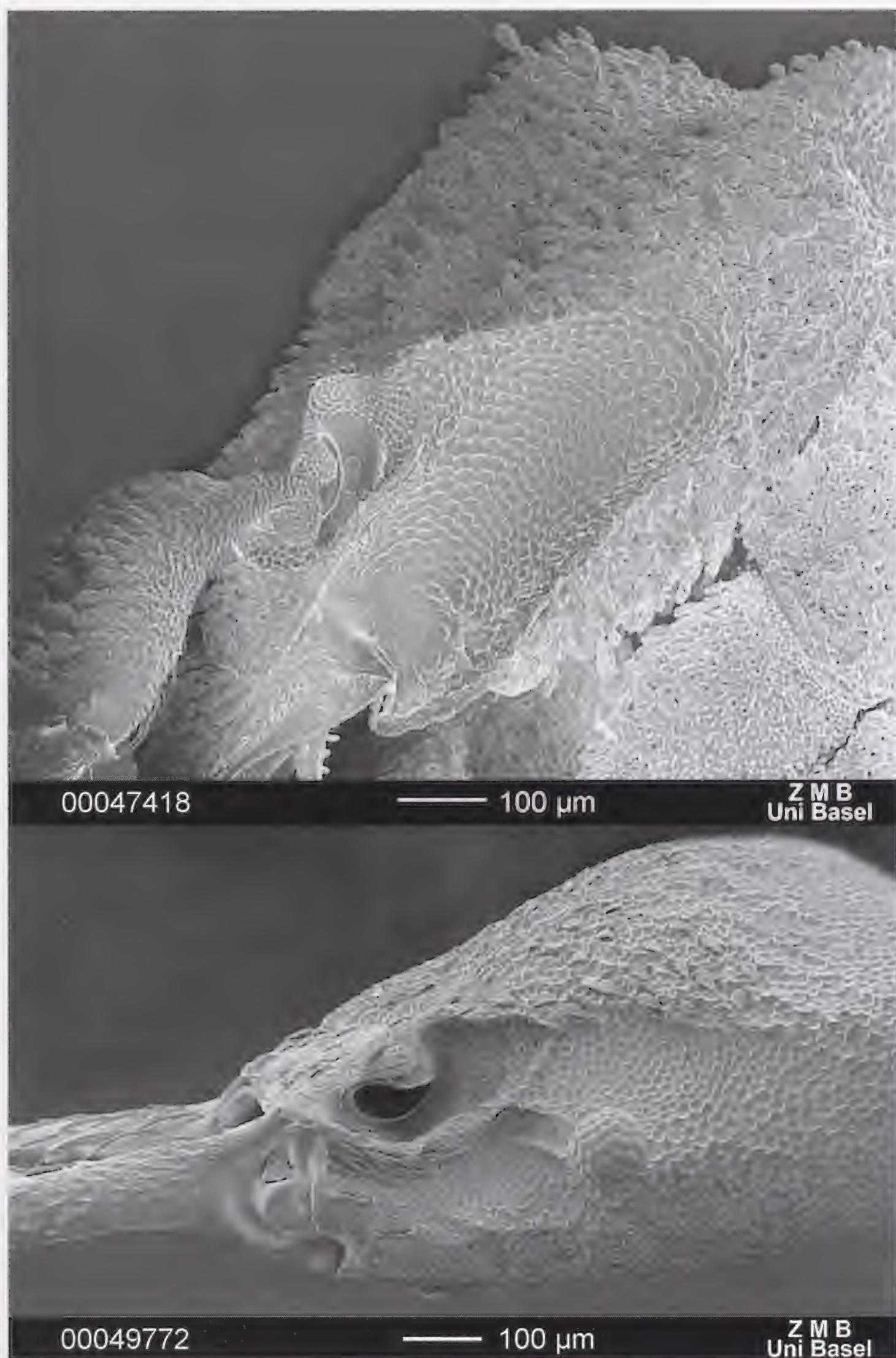


Fig. 18 - Variability of the antennal fossa as a tribal character for the Basicerotini. The basicerotine *Eurhopalothrix heliscata* Wilson & Brown with fossa weakly separated from the scrobe (top) (the fossa should be separated by a crest in all basicerotines) and *Strumigenys godmani* Forel (Dacetini) with crest separating the fossa from the scrobe (bottom) (fossa and scrobe should be confluent, without separating crest among Dacetini).

order to properly code *Tatuidris* not considered by BOLTON (l. c.) and DIETZ (2004). State “2” appears only in the character description and not in the relative table 2 of DIETZ (2004). Polymorphism in *Colobostruma* added to the table because of the (possibly secondary) reduction or absence of the scrobe in some *Colobostruma* species with flat head, as noted by Shattuck in BOLTON (2000:31).

24. Worker. Eyes absent (0), dorsolateral (1), lateral (2), or ventral (3). This is character # 3 of BARONI URBANI & DE ANDRADE (1994), unchanged, and character # 17 of BOLTON (1999) with the addition of state 0 in order to account for some blind *Rhopalothrix* species (BROWN & KEMPF, 1960: 231) and for the first record of a blind “*Pyramica*” (see later the discussion under *Strumigenys inopinata* (de Andrade)). Considering *Rhopalothrix inopinata* de Andrade in *Pyramica* – as suggested by DIETZ (2004) and provisionally accepted for the present study – or leaving it in *Rhopalothrix* as it was originally described, does not affect either the number or the topology of the possible shortest trees. Only the tree length is one-step shorter when *inopinata* is left in *Rhopalothrix*.

25. Worker. Occipital foramen not in a depression (0), or in a deep depression surrounded by a continuous cuticular margination (1). This should be another basicerotine synapomorphy according to BOLTON (1998: 71) and DIETZ (2004, char. # 19). There is no completely marginate depression at least in *Octostruma balzani* Emery and *Rhopalothrix ciliata* Mayr. On the contrary, some *Strumigenys* and *Pyramica* species have the occipital foramen in a much more marginate depression than the one of the previous basicerotine examples (see Figs. 19 & 20). In *Pyramica minkara* (Bolton), not photographed for the present study, the phenomenon is even more evident.

26. Worker. Head of normal shape (0), or pyriform (1). This is the dacetine “typical” character of the classic literature (e. g. EMERY, 1924), equivalent to char. # 1 of BARONI URBANI & DE ANDRADE (1994). It is also equivalent to the “anterior head capsule is narrowed from side to side” of BOLTON (1998: 68) where it is given as synapomorphy of the “dacetonine tribe-group”. BOLTON (1998), carefully reflected in DIETZ (2004), defines much better this character and suggests a “Mandibular-Torular Index (MTI)” to quantitatively express it. As we already explained in the Methods chapter (q. v.), as it was originally formulated, this is a Ratio and not an

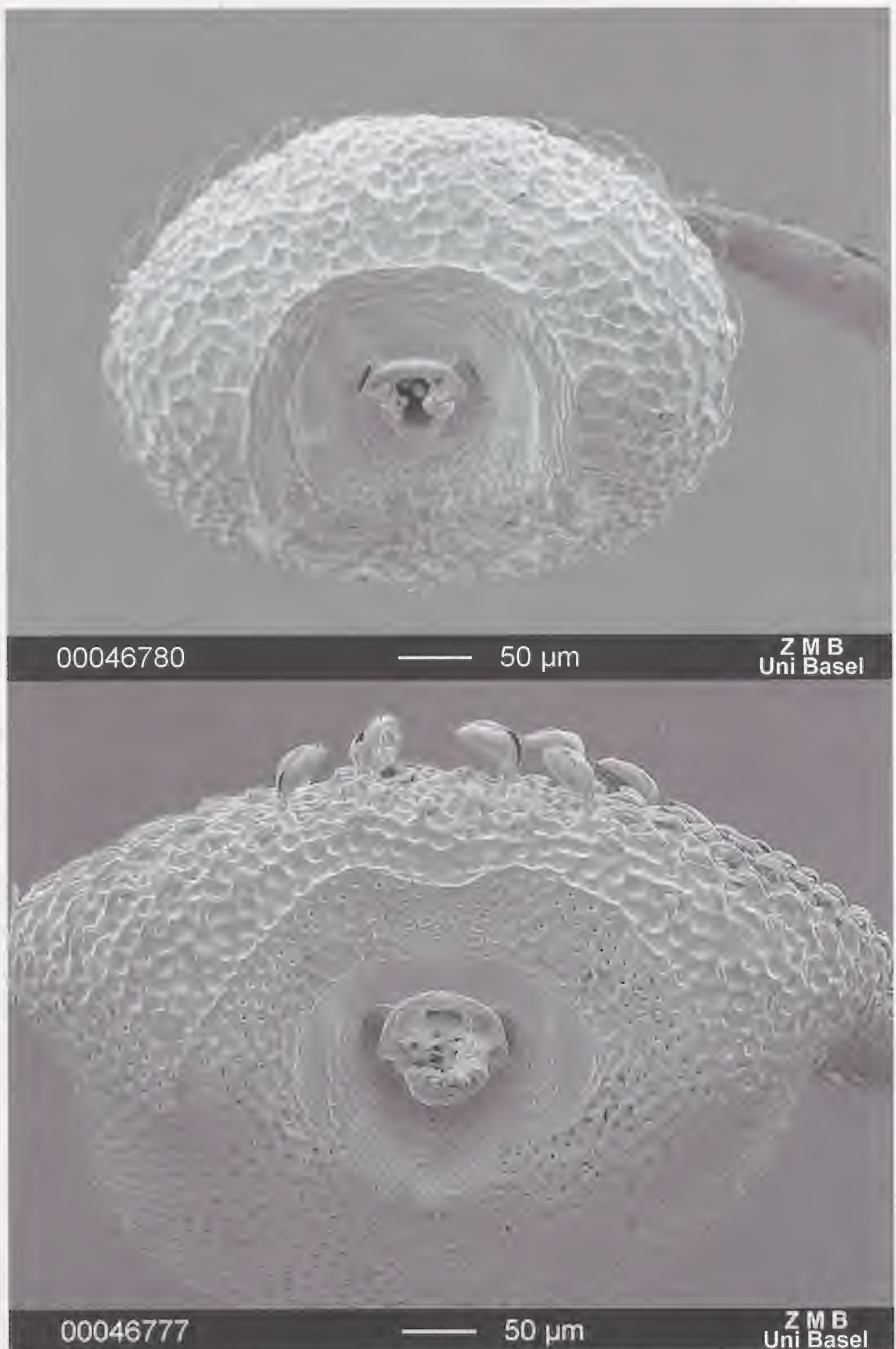


Fig. 19 - Inadequacy of the occipital foramen as a tribal character for the Basicerotini. *Pyramica tenuissima* (Brown) (top) and *Rhopalothrix ciliata* Mayr (bottom). Note the margination of the foramen absent or weak in *Rhopalothrix* and the deep margination in *Pyramica*.

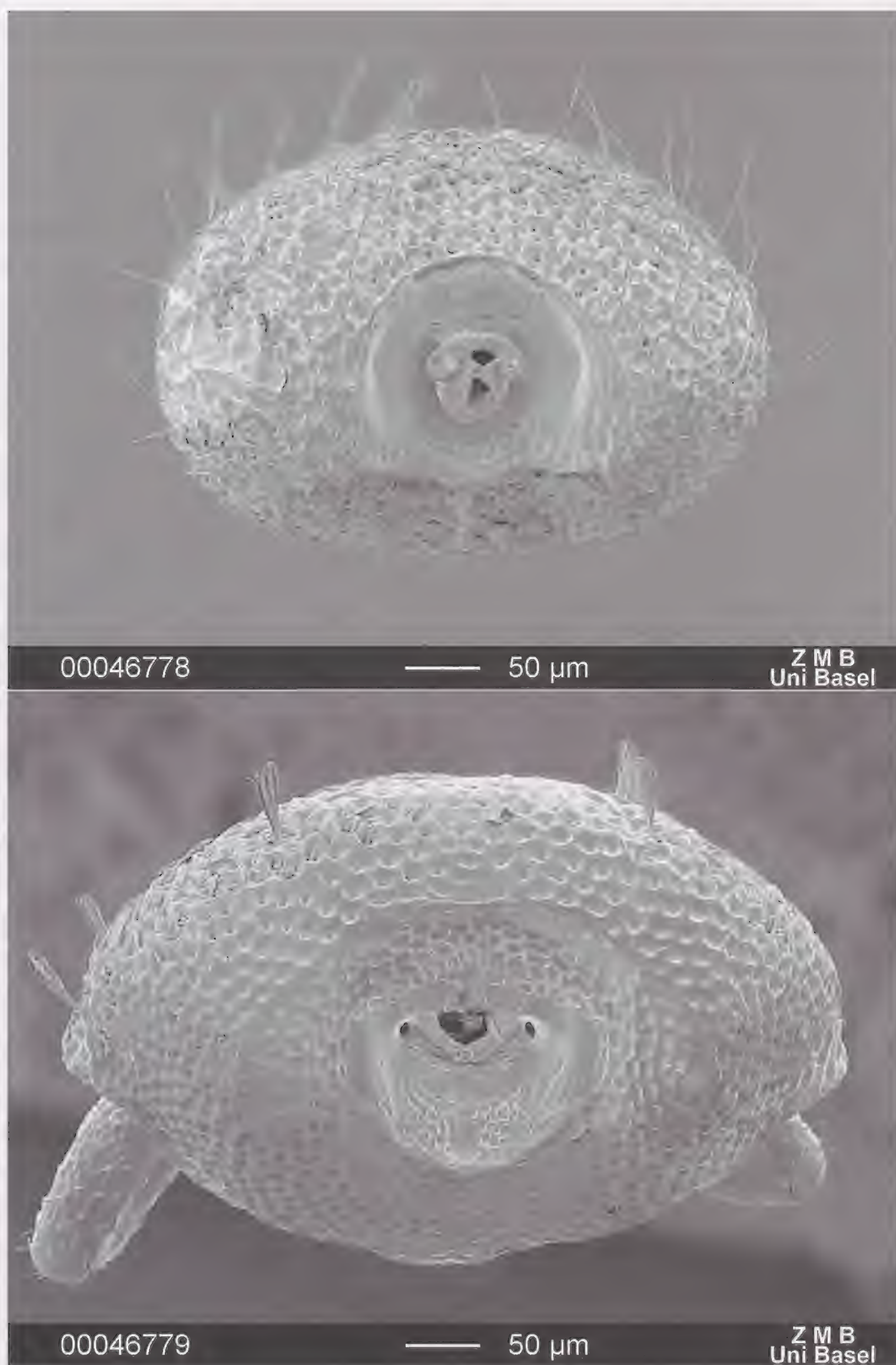


Fig. 20 - Inadequacy of the occipital foramen as a tribal character for the Basicerotini. *Strumigenys ekasura* Bolton (top) and *Octostruma balzani* (Emery) (bottom). Note the margination of the foramen absent or weak in *Octostruma* and the deep margination in *Strumigenys*.

Index. Bolton's quotient, hence, should be called "Mandibular-Torular Ratio". In our case, the Dacetini should have a ratio 0.5-1.3, and most remaining Myrmicinae a ratio between 1.5-3.0. Maintaining the MTI as an index means its reformulation as $MTI = (\text{distance between the points where the outer margin of the fully closed mandibles intersect the anterior clypeal margin}) \times 100 / (\text{maximum distance between the lower margins of the toruli})$. In our matrix, hence, $MTI > 150$ (0), and $MTI < 130$ (1). In *Tatuidris* $MTI \approx 90$.

27. Worker. Occipital foramen posterior (0), or dorsal (1). The dorsal position is a classical, excellent autapomorphy for *Daceton*.

28. Worker. Pronotal cervix without (0) thick, transverse rim, or with a thick, transverse rim (1). This should be a synapomorphic trait for *Microdaceton* according to BOLTON (1999).

29. Worker. Promesonotal suture mobile (0), or fused (1). The dorsal position is character # 10 of BARONI URBANI *et al.* (1992).

30. Worker. Cuticular processes of promesonotum absent (0), or present (1). This is character # 24 of BOLTON (1999) but coded differently from BOLTON (l. c.) in a number of genera for the following reasons: *Epopostruma*, polymorphic (instead of present only) because of absence of process in *E. curiosa* Shattuck (BOLTON, 2000, Fig. 88); *Mesostruma*, polymorphic (instead of present only) because of absence of the process in *M. browni* Taylor (BOLTON, 2000, Fig. 57). *Strumigenys*, polymorphic (instead of absent only) because of presence of the process in *S. loriae* Emery (BOLTON, 2000, Fig. 485).

31. Worker. Mid and hind tibial spurs present (0), or vestigial to absent (1). Absence of tibial spurs is regarded as potentially synapomorphic for the "dacetonine-group" by BOLTON (1998: 70). As Bolton correctly writes, the commonness of the apomorphic condition among Myrmicinae renders it difficult attributing phylogenetic value to this character. Tibial spurs are missing in *Stegomyrmex* and in *Calyptomyrmex*, but present in *Tatuidris*.

32. Worker. Mesosternal hair beds invisible in profile (0), visible in profile (1), or hypertrophic in profile (2). BROWN (1978) first described this structure in *Pilotrochus* adding: "this organ appears to be the external part of an exocrine gland or glands". BARONI URBANI & DE ANDRADE (1994: 61 & Fig. 36) recorded a similar structure in *Strumigenys assamensis* and called it "mesopleural presumed glandu-

lar area". BOLTON (1998) seized this belief under the name "mesopleural gland" and later (BOLTON, 1999) called it "hair-lined gland of mesopleural anterior margin". DIETZ (2004) also calls it "glândula da mesopleura" referring to BOLTON (1998). As a matter of fact there is no visible gland in this body region. There are broad hair beds probably made out of sensilla trichoidea on the mesosternum. When these hairs are particularly developed and/or abundant, they became visible also on the profile (Fig. 21) and have been misinterpreted as a glandular opening. This trait is given as a potential synapomorphy of Dacetonini + Phalacromyrmecini by BOLTON (1998: 73) and is practically equivalent to character # 23 in BOLTON (1999) where it appears as synapomorphic for *Pyramica* and *Strumigenys* only (sic!). DIETZ (2004, char. # 25) also uses this character and refers to BOLTON (1998) but presents it as exclusive of the Phalacromyrmecini. The hairs, however, are well visible in profile also in some *Colobostruma*, *Mesostruma*, *Epopostruma*, *Orectognathus*, *Basiceros*, *Eurhopalothrix*, *Rhopalothrix*, and in *Octostruma balzani* (Emery).

33. Worker. Metapleural gland orifice absent, round or not covered by a longitudinal integumental ridge never opening dorsally to posterodorsally (0), or with a longitudinal slit or narrow crescent opening dorsally to posterodorsally (1). This is given as myrmicine synapomorphy by BOLTON (2003: 52) and should exclude *Tatuidris* from the subfamily Myrmicinae.

34. Worker. Metapleural gland opening visible, i. e. not covered by the slit of character # 33 (0), or invisible (1). This is character # 21 of BOLTON (1999).

35. Worker. Metapleural gland bulla [widely, according to Bolton] separated from annulus of propodeal spiracle more than the diameter of the spiracle [Dietz] (0), or [very close to the annulus of the propodeal spiracle (Bolton)], at most equal to the diameter of the spiracle and often touching the border of the bulla [Dietz] (1). This is character # 22 of BOLTON (1999) and character # 26 of DIETZ (2004). Coding of this character, however, differs diametrically between Bolton and Dietz. There are obvious difficulties in standardizing some of Bolton's words like "widely" or "very". For this reason, we followed DIETZ's (2004) definition and we further precise it by stating that we consider as spiracle only the true tracheal opening without the surrounding bulging area. Having said

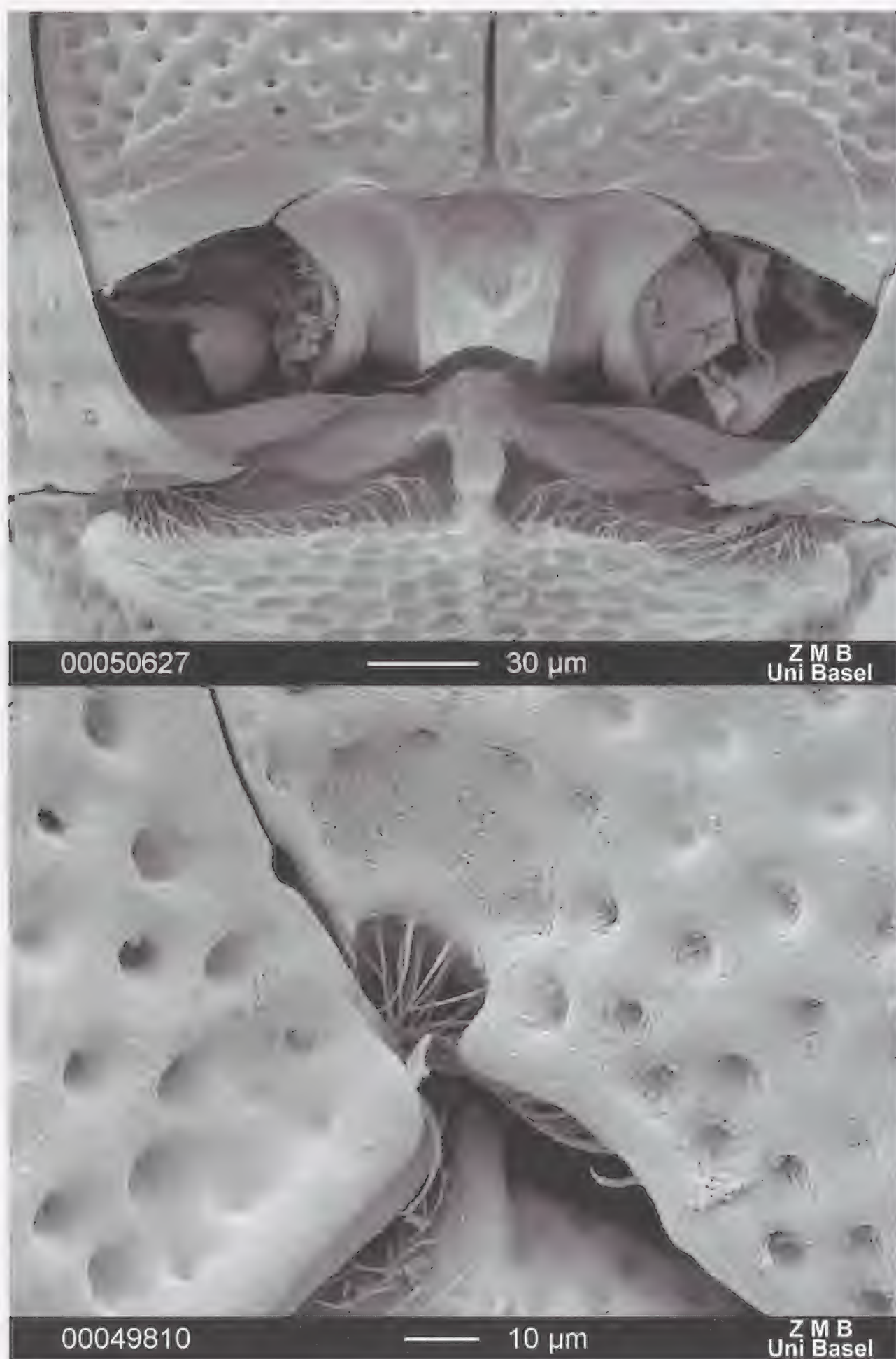


Fig. 21 - *Octostruma balzani* (Emery) (Basicerotini). Sensilla trichoidea grouped to form mesosternal hair beds (top) in ventral view. The hair beds under normal conditions and in ventral view are concealed by the procoxae; they turn out to be visible here after dissection. When the sensilla are particularly long or abundant they become visible also on the profile (bottom). This structure, widespread among several genera included in this study, was interpreted as an exocrine gland in the previous literature, and was given as synapomorphic for the tribes Dacetini + Phalacromyrmecini by BOLTON (1998) and as synapomorphic for the genera *Strumigenys* and *Pyramica* alone by BOLTON (1999). According to DIETZ (2004), the “gland” is autapomorphic for the Phalacromyrmecini.

that, our coding of this character is drawn from our own study of the ants and differs from both, slightly from the one of Bolton in the polymorphism of *Colobostruma* only, and radically from the one of Dietz. We can easily and entirely defend our coding on the base of the species that we studied.

36. Worker. Katepisternal oblique groove absent (0), or present (1). Presence of the groove should be a synapomorphy of the tribe Phalacromyrmecini according to BOLTON (1998: 72). Examination of the holotype of *Phalacromyrmex fugax* Kempf shows that there is no trace of groove in the type genus of the tribe, *Phalacromyrmex* (Fig. 22). Our “discovery” is confirmed by the original description by KEMPF (1960a) and by the redescription by BOLTON (1984). Both authors, for *Phalacromyrmex*, speak only of oblique costulation, a trait used also by BOLTON (1984: 378) to differentiate *Phalacromyrmex* (where the groove is absent) from *Ishakidris* (groove present). A few pages later, BOLTON (1984: 381) adds that the “mesopleural organ... in *Pilotrochus*... is... apparently not subtended by the open groove seen in *Ishakidris*”. The katepisternal groove, hence, is coded as autapomorphic for *Ishakidris* in this paper. Its synapomorphic value for the Phalacromyrmecini pretended by BOLTON (1998) was already discredited in an earlier paper by BOLTON (1984). But BOLTON (2006a) defends again the tribal status of Phalacromyrmecini on the generic presence of “some katepisternal system that appears to channel the products of the mesopleural gland posteroventrally”. Unfortunately the gland in question has been not yet discovered and the hair-like structures suggesting its existence are sensilla trichoidea widespread among the Dacetini (see our discussion under character # 32). The holotype of *Pilotrochus besmerus* Brown equally shows no traces of the katepisternal groove or, if such a “katepisternal system” is present, there are three equivalent systems pointing respectively frontward, upwards and backwards. This situation is perfectly visible also in BROWN’s (1978) Fig. 2 cited by BOLTON (2006a) to defend his recording the presence of the groove. No katepisternal system of any kind is visible in *Phalacromyrmex* (Fig. 22).

37. Worker. Lower mesopleura without (0), or with marked longitudinal costulation (1). This seems to be the most impressive autapomorphy for the genus *Phalacromyrmex* within the broad sample of genera considered here.

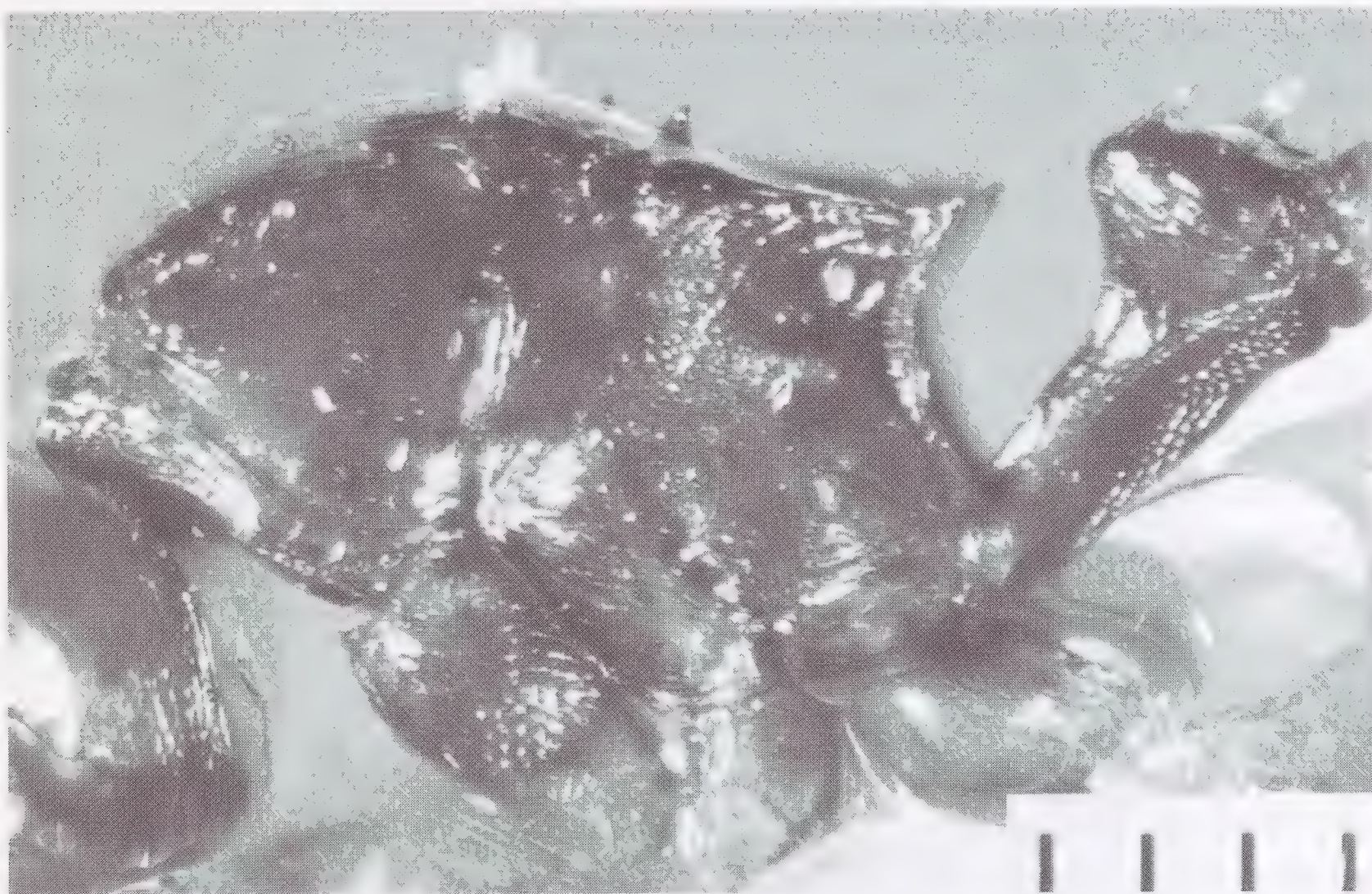


Fig. 22 - *Phalacromyrmex fugax* Kempf, holotype worker, type species of the genus *Phalacromyrmex* which is, in turn, the type genus of the “tribe Phalacromyrmecini”. Mesosoma in profile without traces of katepisternal oblique groove; presence of the groove appears to be the most salient character of the “tribe Phalacromyrmecini” according to BOLTON (1988). Distance between two scale bars 0.1 mm.

38. Worker. Propodeal spiracle in profile at about midlength of sclerite (0), or close to or at declivity (1). This is character # 25 of BOLTON (1999).

39. Worker. Petiole dorsoventrally unfused (0), or fused (1). This is character # 16 of BARONI URBANI *et al.* (1992).

40. Worker. Petiole in posterior view with tergum and sternum differently shaped (0), or with tergum and sternum equally convex, forming a circle (1). This is given as myrmicine synapomorphy by BOLTON (2003: 52) and should exclude *Tatuidris* from the subfamily Myrmicinae. We coded the character as present in all Myrmecinae and absent in *Tatuidris*. Tergum and sternum are actually round also in *Myrmecia* and *Pseudomyrmex*. These structures, however, differ from the one of *Tatuidris* and from the Myrmicinae for being unfused instead of fused. Disregarding the fused or unfused state, as BOLTON (2003) did, this character results parsimony uninformative in our context.

41. Worker. Lateral outgrowths of pedicel absent (0), or present (1). This is character # 28 of BOLTON (1999) coded differently from BOLTON (l. c.) in some genera for the following reasons: *Mesostruma* (polymorphic instead of present only) because of absence in *M. eccentrica* Taylor (BOLTON, 2000, Fig. 56 and present study) *Epopostruma* (polymorphic instead of present only) because of absence of outgrowths in *E. quadrispinosa* (Forel) (BOLTON, 2000, Fig. 76 and present study). BOLTON's (l. c.) matrix records the regular presence of outgrowths for *Pyramica* and *Strumigenys*. This corresponds approximately to the truth only if one considers all outgrowths together, i. e. integumental spines and spongiform appendages. We accepted this interpretation in our matrix but excluded Bolton's next character (character # 29, petiole and postpetiole with or without spongiform tissue) as redundant. In addition, this character should be coded differently from BOLTON (l. c.) in both, *Pyramica* and *Strumigenys*. In *Pyramica* presence of the spongiform appendages is polymorphic (instead of present only) because of absence of spongiform appendages at least in *Pyramica denticulata* (Mayr) (Fig. 23, top) and in *P. eggersi* (Emery) (BOLTON, 2000: 184). Analogously, for *Strumigenys*, BOLTON (2000: 903) states that the whole species group *szalayi* Emery has "spongiform appendages of waist very reduced or absent". *S. tigris* Brown also has no traces of spongiform appendages (Fig. 23, bottom). Bolton's character # 29 (spongiform appendages) alone, after the above corrections concerning *Pyramica* and *Strumigenys*, results cladistically uninformative. Additionally, spongiform appendages are present also in *Colobostruma cerornata* Brown (BROWN, 1959: 2 [description] and Fig. 2; BOLTON, 2000: 39 [description] and Fig. 45); nonetheless *Colobostruma* is coded as without spongiform appendages in BOLTON (1999: 1648) and in the present paper. BOLTON's (1999) character # 29 is also equivalent to character # 27 of DIETZ (2004). BOLTON's (1999) description of his character # 28 as "lateral or ventral outgrows of any form" would practically change only the coding for a number of basicerotine genera as polymorphic instead of absent only, and further blunt the separation between Dacetini and Basicerotini, a universally undesired feature, we suppose.

42. Worker. Postpetiolar tergum and sternum overlapping at junction (0), or meeting end to end (1), This is given as myrmicine synapomorphy by BOLTON (2003: 52) and should exclude *Tatuidris* from the subfamily Myrmicinae.

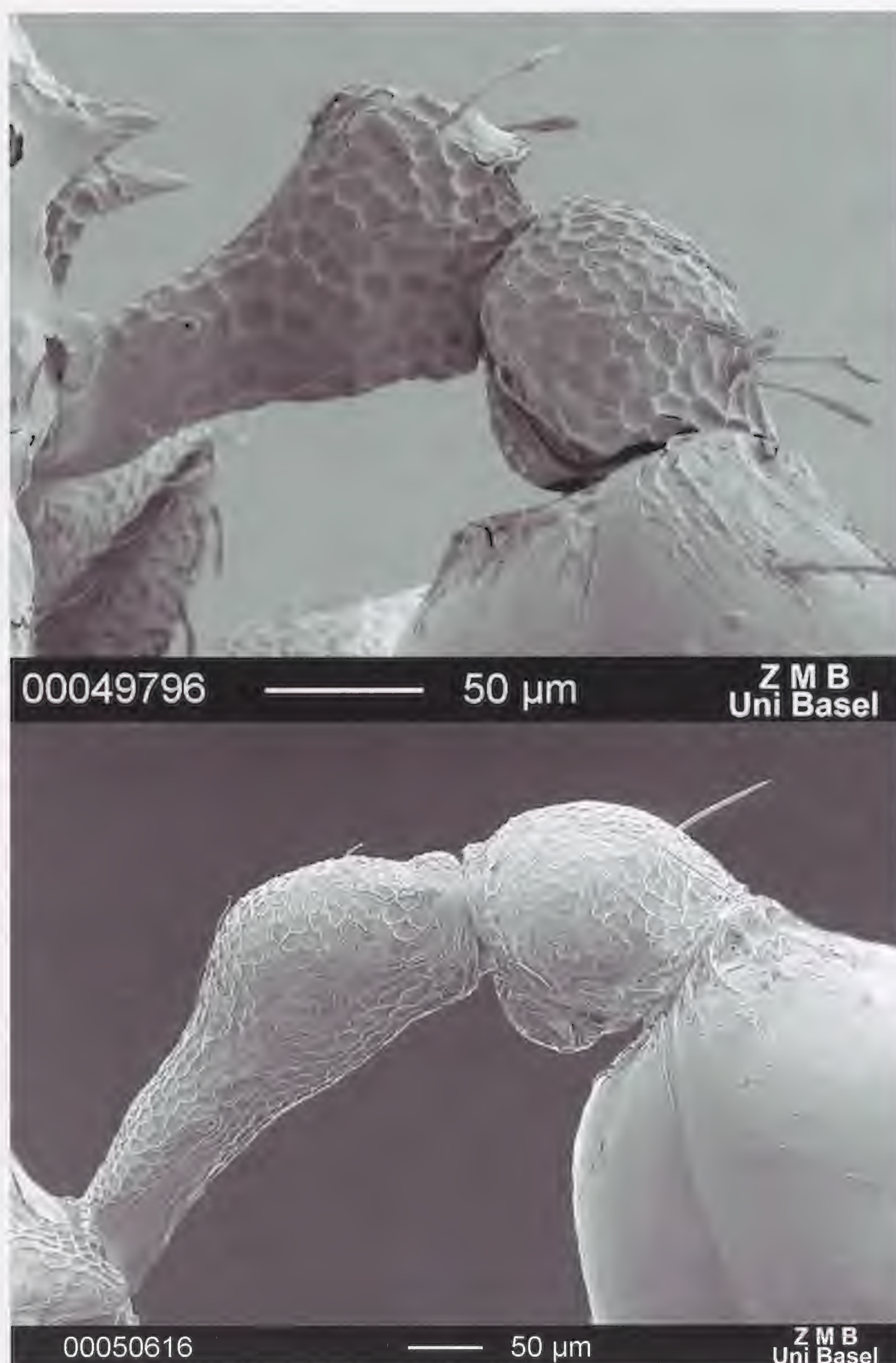


Fig. 23 - Absence of spongiform appendages in *Pyramica denticulata* (Mayr) (top) and *Strumigenys tigris* Brown (bottom). Presence of spongiform appendages is given as synapomorphic for these two genera in BOLTON (1999).

43. Worker. Articulation between gaster and postpetiole narrow (0), or broad (1). A narrow articulation is given as potentially synapomorphic for the Dacetini + Phalacromyrmecini by BOLTON (1998: 72). The narrow condition, however, is widespread in a number of Myrmicinae including most outgroups considered in the present paper. This character, for the ingroup species, is coded polymorphic according to the variation observed while examining the material available for the present study (e. g. *Strumigenys horwathi* Emery and *Pyramica crassicornis* (Mayr) with broad articulation and *Basiceros disciger* (Mayr) with narrow articulation (Fig. 24)). Inclusion or exclusion of this character from calculations or its coding with or without polymorphism affect the length but not the number and the topology of the shortest trees. This is also character # 28 of DIETZ (2004).

44. Worker. Postpetiolar presclerites not set in a concavity or depression (0), or arising from the base of a broad, deeply concave depression (1). This is a synapomorphy for the Basicerotini according to BOLTON (1998: 71) and DIETZ (2004, char. # 24). The postpetiolar presclerites of some *Pyramica* species like *P. denticulata* (Mayr) (Fig. 25) or *P. eggersi* (Emery) (Fig. 26) arise from a deep depression of size and shape perfectly comparable to the one of some Basicerotini.

45. Worker. Pretergite of first gastral segment neck-like (0), or subsessile to sessile (1). State 0 of this character is given as potentially synapomorphic for the Dacetini and Phalacromyrmecini by BOLTON (1998: 72). We added it to our data matrix notwithstanding some perplexities about its meaning (e.g. the neck-like condition seems to be plesiomorphic among myrmicines and, neck-like – a morphological trait – is not perfectly antonymic of sessile) and presence in some taxa. Within the sample of genera considered in the present paper, the sessile condition was coded as synapomorphic for the Basicerotini in spite of numerous cases in which species belonging to the two tribes appear to be indistinguishable (see e.g. Fig. 27, among other possible examples). An anonymous referee insisted that the sessile condition applies also to *Tatuidris*, a condition that we were unable to verify by dissection of the specimens available for the present study. Inclusion or exclusion of this character for parsimony analyses of our data does not affect the number and topology of the shortest tree(s).

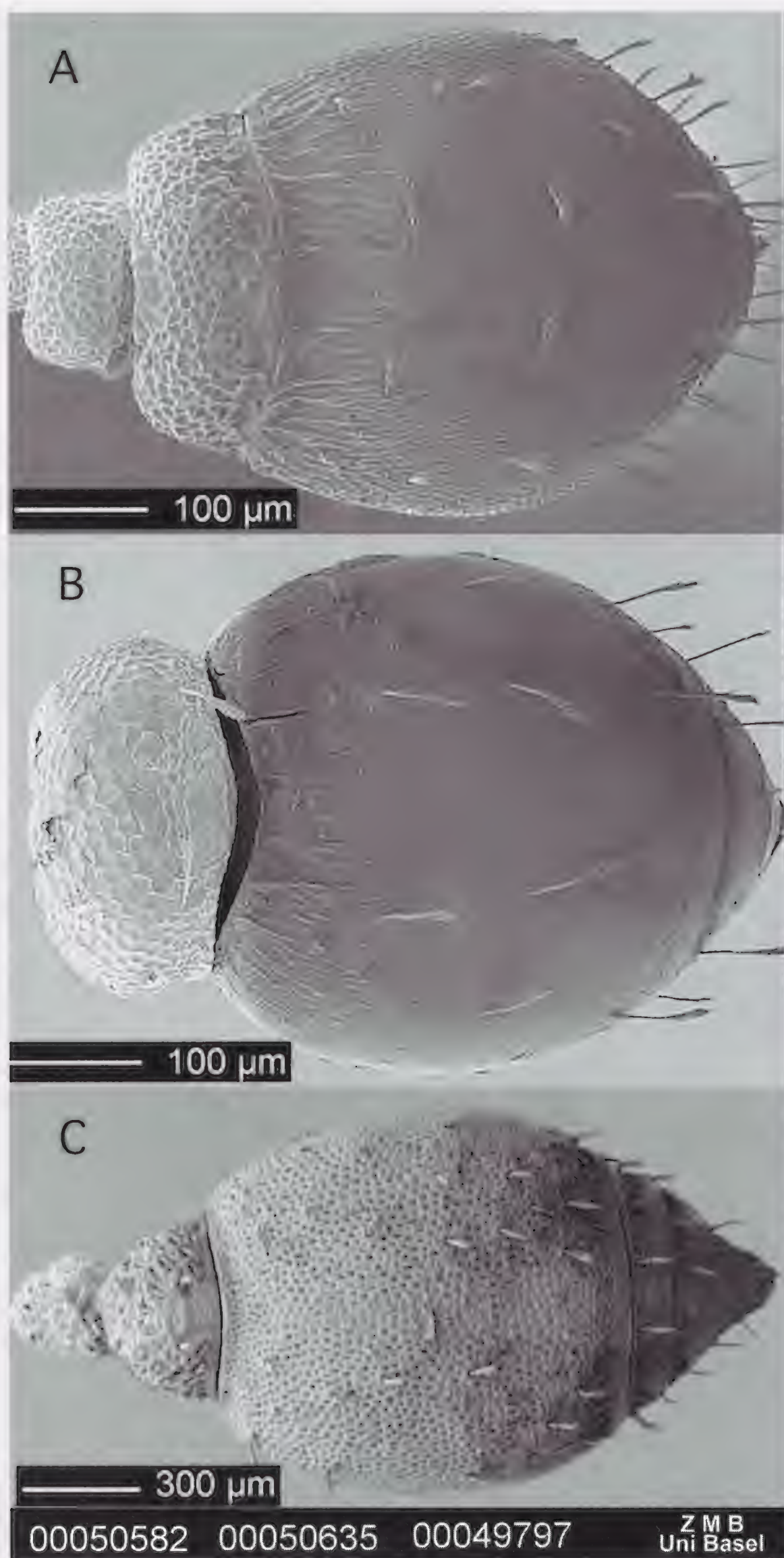


Fig. 24 - Comparably broad articulations between postpetiole and gaster in the dacetines *Strumigenys horwathi* Emery (A), *Pyramica crassicornis* (Mayr) (B) and in the basicerotine *Basiceros disciger* (Mayr) (C). A broad articulation is supposed to be synapomorphic for the basicerotines.

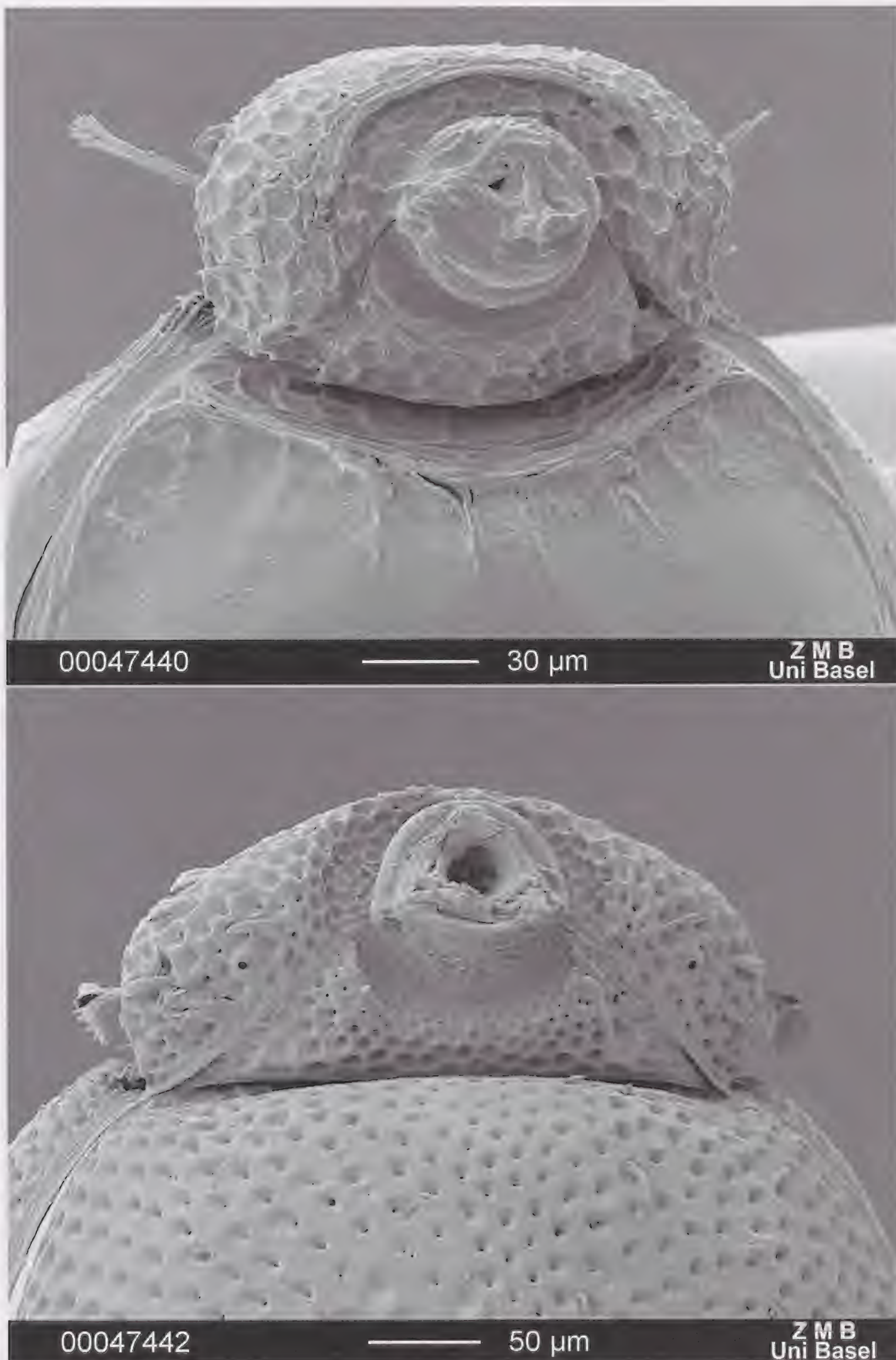


Fig. 25 - Similarity of structure of the postpetiolar presclerites among Dacetini and Basicerotini: *Pyramica denticulata* (Mayr) (Dacetini, top) and *Rhopalothrix ciliata* Mayr (Basicerotini, bottom).

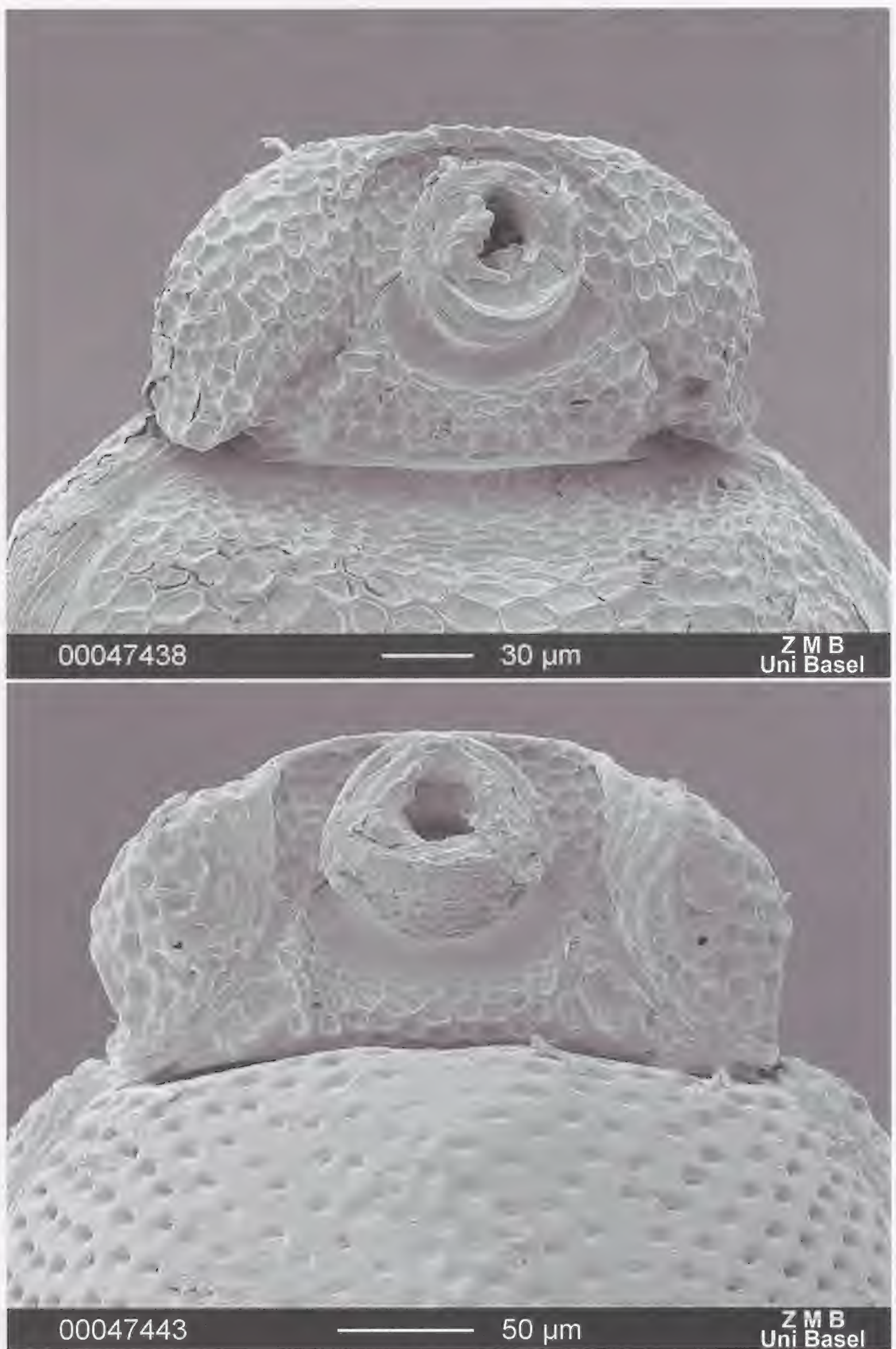


Fig. 26 - Similarity of structure of the postpetiolar presclerites among Dacetini and Basicerotini: *Pyramica eggersi* (Emery) (Dacetini, top) and *Octostruma balzani* (Emery) (Basicerotini, bottom).

46. Worker. “Limbus” (i. e. anterior transverse cuticular ridge of the first gastral tergum) absent (0), or present (1). This is character # 32 of BOLTON (1999). In Bolton’s matrix the character is synapomorphic for *Pyramica* and *Strumigenys*. On the other hand BOLTON (1998: 71) states that the first gastral tergite and sternite of the Basicerotini are synapomorphically marginate basally, immediately behind the postpetiole and adds that “the limbus... is an apomorphy... of the strumigenyite group of Dacetini...and... it is not a homologue of the basal margination developed in Basicerotini”. Not only we are sceptic about this *a priori* declaration of homoplasy, but we are also unable to see differences between the tergal morphology of some basicerotines and the one of some dacetines (Fig. 27). With the best of our will we are unable to see BOLTON’s (1998) differentiation between the presence of this structure “basally” (= Basicerotini only), or “prebasally” (= Dacetini only and not homologous of the former). Our Fig. 27 should be a good support for our interpretation among many other possible ones. In addition, a cuticular ridge is present also on the first gastral tergum of *Colobostruma cerornata* Brown and *Phalacromyrmex fugax* Kempf (present study). DIETZ (2004, character # 30) apparently also disagrees with BOLTON (1998) and considers this character as a synapomorphy of the basicerotines + phalacromyrmicines in his character description but, in his table 2, he codes nonetheless the ridge as present in the basicerotine genera only. In our matrix we coded simply the presence or absence of the sole cuticular ridge that we were able to see.

47. Worker. Suture between first gastral tergite and sternite anteriorly rounded (0), or angulated (1). This is character # 33 of BOLTON (1999).

48. Worker. Base of the first gastral sternum in profile rounded (0), or truncated (1). This is character # 34 of BOLTON (1989) where the truncated condition results as synapomorphic for *Strumigenys* and *Pyramica*. The truncated condition, however, is present also in all Basicerotini, *Colobostruma cerornata* Brown, *Ishakidris* and *Stegomyrmex*. There are, on the other hand, species of both *Pyramica* (e. g. *P. mutica* (Brown)) and *Strumigenys* (e. g. *S. nigra* Brown, *S. tigris* Brown (BOLTON, 2000: Fig. 514)) without truncation.

49. Worker. First gastral tergum and sternum smooth or at least not sharply punctuated (0), or with dense and deep punctures (1). A

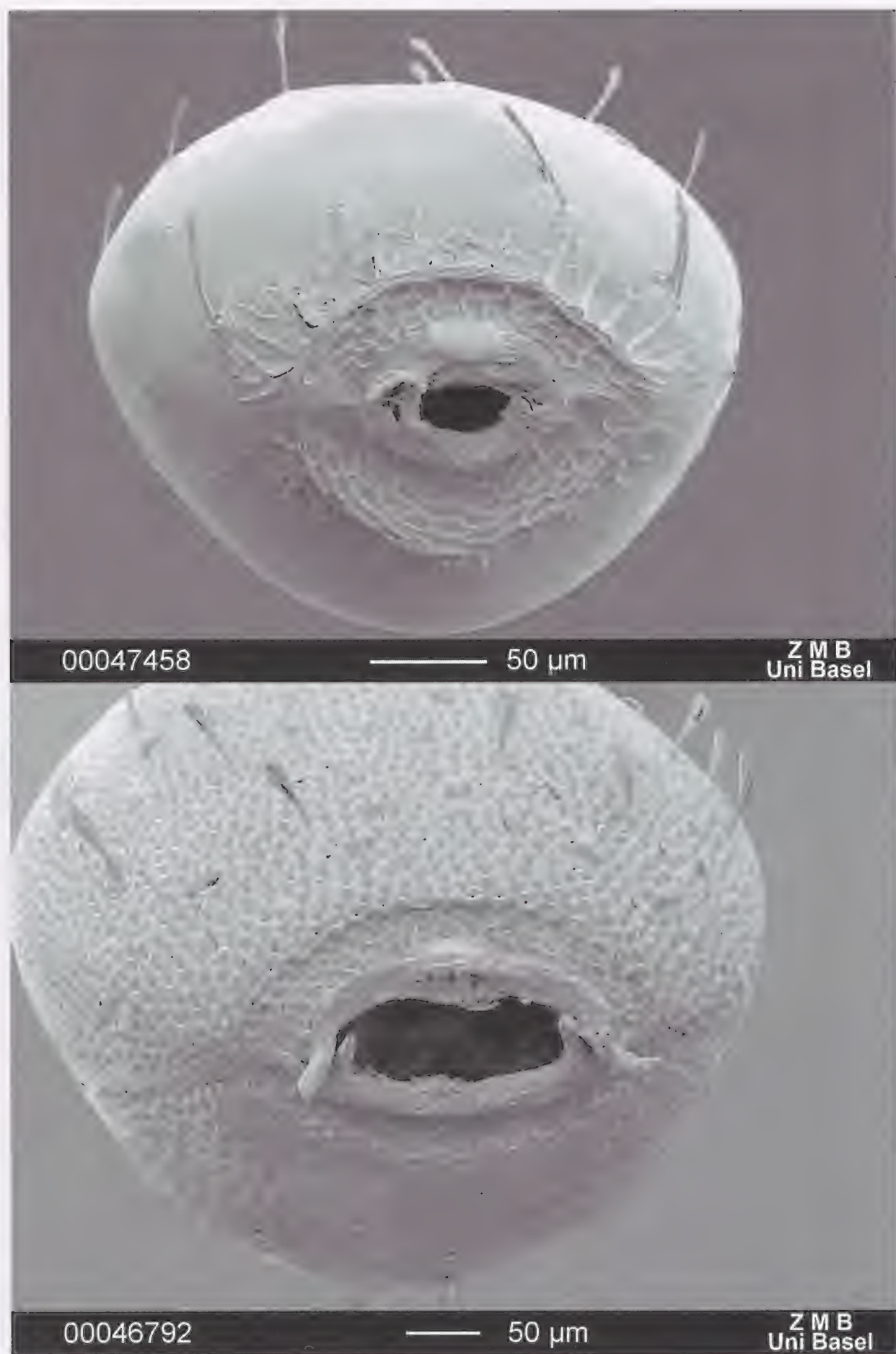


Fig. 27 - Similarity in morphology of the “limbus”, (an anterior cuticular ridge on the first gastral tergum) in the dacetine *Pyramica denticulata* (Mayr) (top) and the basicerotine *Octostruma stenognatha* Brown & Kempf (bottom). This structure is interpreted as synapomorphic for the Basicerotini and, independently derived from this, synapomorphic also for *Strumigenys* + *Pyramica* in BOLTON (1998). The difference between the two synapomorphies is supposed to lie on the fact that no Dacetini have the margination extending to the sternum. In this figure the dacetine *Pyramica* exhibits a much stronger sternal margination than the basicerotine *Octostruma*. Another putative difference between Dacetini and Basicerotini (char.# 45) is a neck-like anterior articulation of the gaster believed to be present among Basicerotini only. Note the practically identical morphology of the two species illustrated here.

punctuated first gastral segment is given as synapomorphic for the Basicerotini by BOLTON (1999: 71). In the same paper BOLTON (l. c.) admits that in some species this sculpture may be “secondarily reduced or effaced”. As stated at the beginning of this paper, we coded what we observed without *a priori* decisions on its phylogenetic meaning. There are no traces of punctures in *Basiceros* (= *Octostruma*) *onorei* Baroni Urbani & de Andrade (Fig. 28, top), in some *Eurhopalothrix* species already illustrated by TAYLOR (1990) and in *Octostruma balzani* (Emery) from Ecuador (Fig. 28, bottom). DIETZ (2004) also retains this character as basicerotine synapomorphy (his character # 29), but admittedly following BOLTON (l. c.) and without checking the species available to him. In addition, there are a few *Pyramica* species with gastral sculpture perfectly comparable to the one of some basicerotines (Fig. 29).

50. Worker. Bizarre pilosity absent or poorly developed (0), or present and well developed (1). This is character # 27 of BOLTON (1999) but coded differently for *Colobostruma* (polymorphic instead of absent only) because of the presence of bizarre hairs in *C. cerornata* Brown (BOLTON, 2000, Fig. 45). We are not sure about what “bizarre” should or should not include but we followed BOLTON (1999) in coding this character as present in *Strumigenys* and *Pyramica*. As a consequence of this we coded it present also for *Pilotrochus* and *Tatuidris* since the hairs of these genera are virtually identical to those e.g. of *Pyramica medusa* Bolton (BOLTON, 2000, Fig. 296) and *Strumigenys caniophanes* Bolton (BOLTON, 2000, Fig. 490). On the other hand, at least *Pyramica mitis* Brown is completely destitute of standing hairs of any kind (BOLTON, 2000: 442). *Pyramica*, as a consequence of this, was coded as polymorphic. We suppose that this character should be equivalent to DIETZ’s (2004) character # 31 “Pêlos especiais no escapo, pigídio e esternito do 1º segmento do gáster”.

51. Male. Mandibles normally developed (0), or reduced (1). This is character # 34 of DIETZ (2004) differently coded, i.e. developed instead of unknown for *Stegomyrmex* (DINIZ, 1990: 279), and *Orectognathus* (EMERY, 1924: 318 and personal observations), polymorphic instead of reduced only in *Pyramica* (mandibles well developed at least in *P. rostrata* (Emery) and *P. baudueri* (Emery)), polymorphic instead of reduced only in *Eurhopalothrix* because of a



Fig. 28 - Lack of sculpture on the first gastral tergum and sternum in *Basiceros* (= *Octostruma*) *onorei* n. sp. (top) and in *B. balzani* (Emery) from Ecuador (bottom).

sentence of MANN (1922: 41) attributing “mandibles well developed” to the male of *Eurhopalothrix gravis* (Mann).

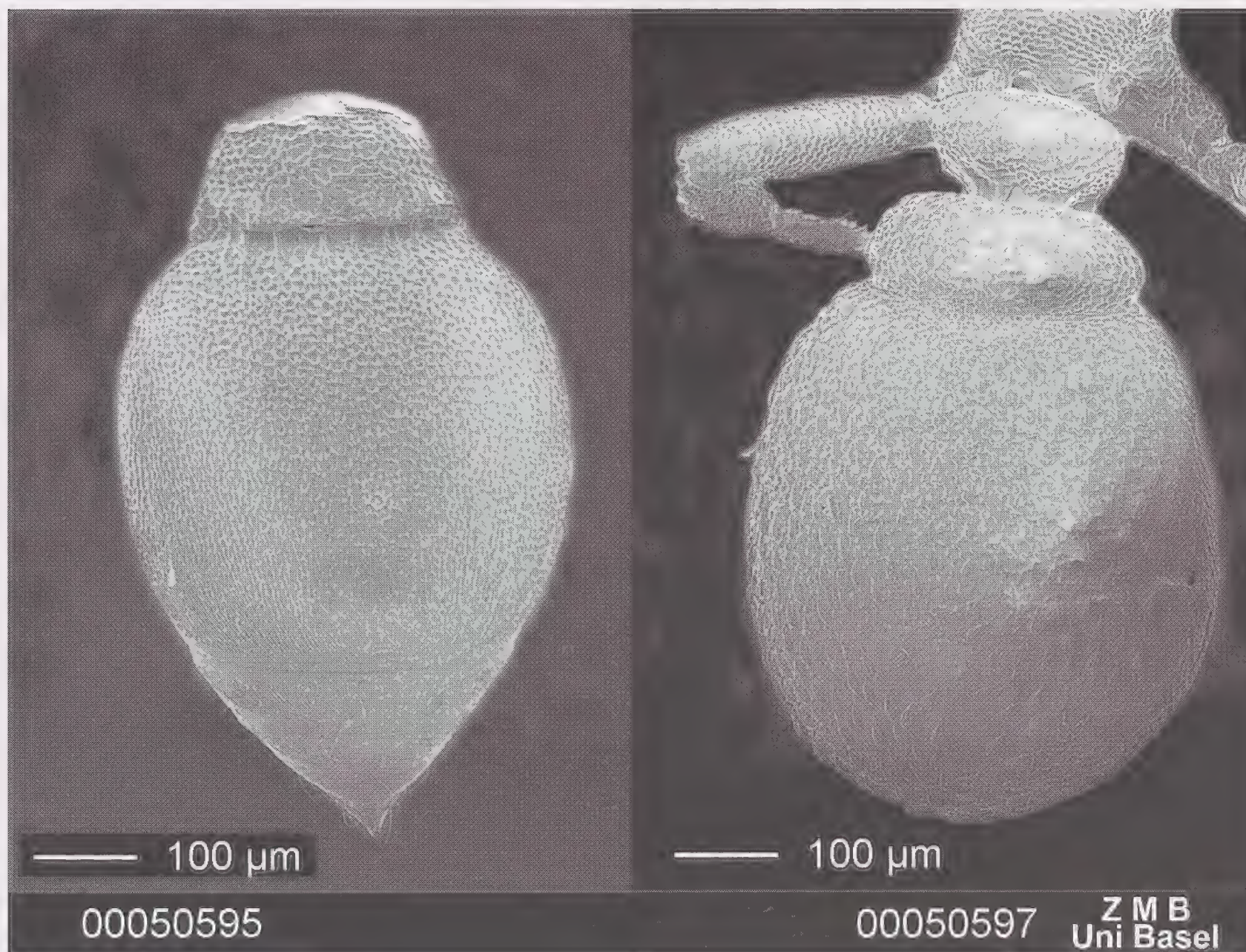


Fig. 29 - Comparable sculpture of the first gastric tergite in the dacetine *Pyramica margaritae* (Forel) (left) and in the basicerotine *Eurhopalothrix bruchi* (Santschi) (right). A sculptured gaster is supposed to be synapomorphic for the Basicerotini and absent among Dacetini.

52. Gyne and male. Anterior wing with (0) or without (1) cell RS. This is character # 37 of DIETZ (2004). Due to the exiguity of the material available to us, except for a few outgroups not considered by DIETZ (2004), this character is coded entirely *fide* DIETZ (2004). This character is cladistically informative only because of the differences between outgroup and ingroup taxa. Within the dacetinomorph genera, this character remains invariant or unknown and, as such, it is without interest for our purpose.

53. Gyne and male. First anal vein of the anterior wing present (0), or absent (1). This is character # 38 of DIETZ (2004). Due to the exiguity of the material available to us, except for a few outgroups

Table 1 - Distribution of the retained characters and character states among the taxa considered in the present study. Character numbering and state coding as explained in the text.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
<i>Myrmecia</i>	0	0	0	0	0	0	0	0	0	0&1	0&1	0	0	0	0	0	0	0	0	0	0	?	0	1	0	0	0
<i>Pseudomyrmex</i>	0&1&2	0&1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	1	0	0	0
<i>Myrmica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0&1	0	0	0	0	0	0	2	0	0	0
<i>Stegomyrmex</i>	4	2	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	2	1	0	0
<i>Calyptomyrmex</i>	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	2	0	0	0
<i>Tatuidris</i>	5	2	0	0	0	0	0	0	2	0	?	?	0	0	1	1	1	0	1	1	0	0	3	2	0	1	0
<i>Acanthognathus</i>	6	3	0	1	0	0	0	1	2	1	0	1	2	0	0	1	0	0	0	0	0	0	0	2	0	1	0
<i>Colobostruma</i>	1	1	0	0	1	0&1	0&1	0&1	2	0	0	0	1	0	1	1	1	0&1	0	0&1	0	0&1	0&2	1	0	1	0
<i>Mesostruma</i>	1	1	0	0	1	0	1	1	2	0	0	0	1	0	1	1	1	0	0	0&1	0	0	2	1	0	1	0
<i>Epopostruma</i>	1	1	0	0	0	0	1	1	2	1	0	0	1	0	1	1	1	0	0	0	0	0	2	1	0	1	0
<i>Microdaceton</i>	3	2	1	1	0	0	1	1	2	1	0	1	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0
<i>Daceton</i>	1	1	1	1	0	0	1	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1
<i>Orectognathus</i>	1	1	1	1	0	0	1	1	2	1	0	1	1	0	1	0	1	0	0	0	1	0	0&1	2	0	1	0
<i>Pyramica</i>	5&6	3	0&1	1	0	0&1	0&1	0&1	2	0&1	0&1	0&1	1	0&1	1	1	1	0&1	0&1	0&1	0	0&1	1	0&3	0&1	1	0
<i>Strumigenys</i>	5&6	3	1	1	0	0&1	1	1	2	0&1	0	0&1	1	0&1	1	1	1	0	0	0&1	0	0&1	1	3	0&1	1	0
<i>Phalacromyrmex</i>	3	2	0	1	0	0	0	1	1	0	1	0	0	1	0	1	1	0	1	0	0	0	1	3	1	1	0
<i>Ishakidris</i>	4	2	0	?	?	0	?	1	2	0	1	0	0	1	1	1	?	0	1	0	0	0	1	3	?	1	0
<i>Pilotrochus</i>	3	2	0	1	0	0	?	1	1	0	1	0	0	1	1	1	1	0	1	0	0	0	1	3	1	1	0
<i>Basiceros</i>	4&5	2&3	0	1	0	1	0	1	2	0	0	0	0	1	0	1	1	1	0	1	0	1	2	2	1	1	0
<i>Eurhopalothrix</i>	5	2&3	0	1	0	1	0	1	2	0	0	0	0	1	1	1	1	1	0	1	0	0&1	2	2	1	1	0
<i>Octostruma</i>	4&5	2&3	0	1	0	1	0	1	2	0&1	0&1	0	0	1	1	1	1	1	0	1	0	1	2	2	0&1	1	0
<i>Protalaridris</i>	5	2	0	1	0	1	0	1	2	1	0	0	0	1	1	1	1	1	0	1	0	1	2	2	1	1	0
<i>Talaridris</i>	5	3	0	1	0	1	0	1	2	1	0	0	0	1	1	1	1	1	0	1	0	1	2	2	1	1	0
<i>Rhopalothrix</i>	5	2	0	1	0	1	0	1	2	1	0	0&1	0	1	1	1	1	1	0	1	0	1	2	0&2	0&1	1	0

Table 1 - (Continued) Distribution of the retained characters and character states among the taxa considered in the present study. Character numbering and state coding as explained in the text.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
<i>Myrmecia</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Pseudomyrmex</i>	0	0	0&1	0	0	0	0	0	0	0	0	0	1	0	0	0&1	0	0	0	0	0	0	0	0	0	0	0
<i>Myrmica</i>	0	1	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0
<i>Stegomyrmex</i>	0	1	0	1	0	1	1	0	0	0	0	1	1	0	1	0	0	0	1	0	0&1	1	0	0	0&1	0	0
<i>Calyptomyrmex</i>	0	1	0	1	0	1	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	1	0	?	?	?
<i>Tatuidris</i>	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0
<i>Acanthognathus</i>	0	1	1	1	0	1	1	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	0&1	0
<i>Colobostruma</i>	0	1	1	1	0&1	1	1	0&1	0	0	1	1	1	1	1	1	0	0	0&1	1	0&1	0	0&1	?	?	?	0
<i>Mesostruma</i>	0	1	0&1	1	0&1	1	1	1	0	0	1	1	1	0&1	1	0	0	0	0	0	1	0	0	1	1	0	0
<i>Epopostruma</i>	0	1	0&1	1	0&1	1	1	1	0	0	1	1	1	0&1	1	0	0	0	0	0	1	0	0	?	?	?	?
<i>Microdaceton</i>	1	1	1	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	?	?	?	?
<i>Daceton</i>	0	1	1	1	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0
<i>Orectognathus</i>	0	1	0&1	1	0&1	1	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0
<i>Pyramica</i>	0	1	0	1	1	1	1	0	0	0	1	1	1	0&1	1	0&1	0&1	0	0	1	0	0&1	0&1	0&1	1	1	0
<i>Strumigenys</i>	0	1	0&1	1	1	1	1	0	0	0	1	1	1	0&1	1	0&1	0	0	1	0	0	0&1	1	1	1	1	0
<i>Phalacromyrmex</i>	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	1	0	1	0	0	0	1	?	?	?	?
<i>Ishakidris</i>	0	1	0	1	1	1	?	0	1	0	1	1	1	0	1	0	?	0	1	?	1	0	1	?	?	?	?
<i>Pilotrochus</i>	0	1	0	1	2	1	1	0	0	0	1	1	1	0	1	0	1	0	1	0	0	0	1	?	?	?	?
<i>Basicros</i>	0	1	0	1	0&1	1	1	0	0	0	1	1	1	0	1	0&1	1	1	1	1	0	1	1	0	1	0	0
<i>Eurhopalothrix</i>	0	1	0	1	0&1	1	1	0&1	0	0	1	1	1	0	1	1	1	1	1	1	1	0&1	1	0&1	1	0&1	1
<i>Octostruma</i>	0	1	0	1	0&1	1	1	0&1	0	0	1	1	1	0	1	0	1	1	1	1	0	0&1	1	0	1	0	0
<i>Protalaridris</i>	0	1	0	1	0	1	1	1	0	0	1	1	1	0	1	0	1	1	1	1	1	1	1	?	?	?	?
<i>Talaridris</i>	0	1	0	1	?	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	?	?	?	?
<i>Rhopalothrix</i>	0	1	0	1	0&1	1	1	0&1	0	0	1	1	1	0	1	1	1	1	1	1	0	1	1	?	1	1	0

not considered by DIETZ (2004), this character is coded essentially *fide* DIETZ (2004: table 2); Dietz's table, however, records the anal vein as present in *Eurhopalothrix*, but Dietz's generic diagnosis (p. 66) states that in *Eurhopalothrix* the anal veins can be "ausentes, incompletas, ou na forma de veias espectrais". For this reason we coded the anal vein as polymorphic in *Eurhopalothrix*. In addition, DIETZ (l. c.) codes the anal vein as absent in *Acanthognathus* but we considered it as polymorphic because of a drawing by BROWN & KEMPF (1969. Fig. 7) depicting a male of *A. rudis* with anal vein.

54. Gyne and male. Pterostigma present (0), or absent (1). Absence of pterostigma is an autapomorphy of the genus *Eurhopalothrix* according to DIETZ's (2004) character # 36.

The distribution of these character states among the taxa included in the present study is given in Table 1.

4.2. CHARACTERS USED IN OTHER PHYLOGENETIC STUDIES AND EXCLUDED FROM THE PRESENT ONE

As already stated in the paragraph devoted to the outgroup selection we did not consider the 7 autapomorphies and the 4 plesiomorphies attributed by BOLTON (1998: 68) to *Tatuidris*. These are parsimony non-informative by definition (see e. g. HENNIG, 1950, WILEY, 1980, and MADDISON & MADDISON, 2002, among many other possible sources). Autapomorphies and plesiomorphies may be very useful in appreciating how distinctive a taxon can be but contribute nothing to its placement within a phylogeny. Stated otherwise, considering all the characters listed by BOLTON (1998) and even adding many more similar new ones would not affect our phylogenetic reconstruction.

Other characters appearing in the literature and excluded from the present study are listed in the following.

Presence of a preocular carina (synapomorphy of the "dacetone tribe-group" in BOLTON (1998:69)). Equal to character # 14 of DIETZ (2004). We are unable to see traces of the carina in a number of dacetines like, e.g. *Epopostruma natalae* Shattuck, *Microdaceton tibialis* Weber, *Daceton armigerum* (Latreille), *Acanthognathus ocellatus* (Mayr). The carina, on the other hand, is present in a number of non-dacetine myrmicines like several Attini.

BOLTON's (1999) character # 6. Number and position of trigger hairs. In Bolton's matrix this character is unique (i. e.) autapomorphic for *Microdaceton* and *Acanthognathus* with a different character state for each of these genera. Unfortunately, coding all the other genera considered by Bolton as uniformly with paired trigger hairs is far from being satisfactory. In some instances (e. g. in *Pyramica myllorhapha* (Brown)) the labral hairs are so small that we strongly hesitate to differentiate them from normal hairs and to call them trigger hairs. In addition, the remaining genera considered in the present paper but excluded by BOLTON (1999) show a wide array of different morphologies, which, wrestling with character definitions, could lead only to a longer set of doubtful generic autapomorphies at most. The simple presence of "trigger hairs" on the mouthparts is given as synapomorphic for the "dacetonine-group" by BOLTON (1998) and retained as such also by us (our char. # 8).

BOLTON's (1999) character # 13 and DIETZ (2004) character # 17. Scape in "normal resting position" above or below the eye. This character is either equivalent to Bolton's char. # 16 states 1-2 ("scrobe above... below eye") or impossible to assess on preserved material in which the antennae have been mounted.

BOLTON's (1999) character # 15 (scape apical section angled or not angled). Either we misunderstand Bolton's description of it or we should code this character in a way rather different from BOLTON (l. c.). It can be excluded without losses for Bolton's phylogeny since in Bolton's original resulting tree (BOLTON, 1999, Fig. 3) this character has $CI = 0.33$ and does not contribute at all to Bolton's phylogeny ($RI = 0.0$).

BOLTON's (1999) character # 17. "Eyes... not ventrolateral" vs. "eyes... ventrolateral" is excluded in favour of BARONI URBANI & DE ANDRADE's (1994) information richer char. # 3, eyes absent, dorso-lateral, lateral, or ventral.

BOLTON's (1999) character # 18. Gap between mandibles and head capsule in profile. This character, in Bolton's matrix, is shared by *Daceton* and *Microdaceton* only, although the two genera appear as distantly related in Bolton's phylogeny. We excluded it simply because we are unable either to understand its description or we'd code it in a different way. Bolton's original coding, anyway, does not support his phylogenetic reconstruction. As a consequence of

this, later on in the same paper (BOLTON, 1999:1678), this character state is given as autapomorphic for *Microdacton*.

BOLTON's (1999) character # 19. Presence or absence of the basimandibular gland. In BOLTON (1998:73) this character is given as synapomorphic for the tribes Dacetini and Phalacromyrmecini. In BOLTON's (1999) matrix, this character is recorded for *Pyramica*, *Strumigenys* and *Microdacton* only. We excluded it simply because either we are unable to understand its description or we'd code it in a way different from both BOLTON (1998) and BOLTON (1999) (e. g. polymorphic for *Strumigenys*, *Pyramica* and *Rhopalothrix*). As a further proof of our claim, we remember that this same character in DIETZ (2004) (char. # 5, table 2) is coded differently from BOLTON (1999) for the following genera: *Microdacton*, *Pyramica*, and *Strumigenys*.

BOLTON's (1999) character # 20. Presence of apicofemoral and apicotibial glands (or, more generically, "series of paired exocrine glands"). This trait is given as synapomorphic for *Strumigenys* and *Pyramica*. But, a few pages later, BOLTON (l.c.: 1665) adds "the [apicofemoral] gland is apparently absent or at least has no externally visible bulla, in some whole groups and a number of individual species". And, for the apicotibial gland "variation is as for the femoral dorsal gland". The observed polymorphism of these glands in both, *Pyramica* and *Strumigenys*, renders their use for the cladistic analysis parsimony uninformative.

BOLTON's (1999) character # 26 "Metapleural gland bulla low and widely separated from propodeal spiracle...", versus "abutting propodeal spiracle". This is a repetition of BOLTON's (1999) character # 22 "Metapleural gland bulla widely separated from annulus of propodeal spiracle...". It differs from it for being coded in three steps instead of two. The newly added third step (metapleural gland bulla high and close to spiracle) appears only once as redundant autapomorphy for *Acanthognathus*. Otherwise chars. 22 and 26 have exactly the same score and appear synapomorphic for five dacetine genera. A very similarly defined character ("Propodeal spiracle low ... abutting the... metapleural gland bulla") was already used by BOLTON (1998: 73) as synapomorphy for the tribes Basicerotini and Phalacromyrmecini contradicting in this way BOLTON's (1999) definition. We regard this multiple use and different coding of similarly defined characters as an additional reason for exclusion from our data matrix.

BOLTON's (1999: 1649) character # 29. Presence of spongiform appendages of petiole and postpetiole. This was originally formulated as a plausible synapomorphy for *Strumigenys* and *Pyramica* (but see also discussion under our character 41). Presence or absence of spongiform appendages on the pedicel was already included in BOLTON's character # 28 (1999: 1649) under the more generic definition of "lobes or outgrowths of any form" and, under this definition, is also considered in our analysis as character # 41.

BOLTON's (1999) character # 30. "Tergite of petiole and postpetiole without lateral cuticular processes". Excluded since we are unable to understand the difference with Bolton's char. # 28 "Petiole and postpetiole without lateral (tergal) or ventral (sternal) lobes or outgrowths of any form..."

BOLTON's (1999) character # 31. Postpetiolar spiracle lateral or ventral. We are sceptic about this character due to the difficulty in observing it. The spiracle is practically in the same position among most of the species that we examined. When the petiole is laterally expanded or bears a lateral lamella, the spiracle appears to be more ventral than when the expansions or the lamellae are absent. Coding this character as Bolton did and considering it with the others in our search for the shortest tree(s) does not affect the number and topology of the shortest trees but increases the tree length.

BOLTON (1999: 1681). Labrum "mediodorsally with a very broadly and deeply concave depression in its proximal half". This should be an *Epopostruma* synapomorphy. In contrast with this assumption, the morphology of *Mesostruma turneri* (Forel) is perfectly comparable e.g. to the one of *Epopostruma alata* Shattuck (Fig. 30).

BOLTON's (1998: 70) synapomorphy for the Basicerotini "scape neck articulation" is another formulation of and correlated with his previous character "torulus" described at the same page and already included in our data matrix.

DIETZ's (2004) character # 3, "Forma do labro". The labrum should be longer than broad in all dacetine genera and broader than long in other ants. This rule of thumb applies well to a majority of species but there are numerous exceptions like broad labia in *Daceton* (present study), *Rhopalothrix* (BROWN & KEMPF, 1960, Figs. 57 & 58), *Basiceros* (nr. *singulare*, present study), *Pyramica* (e. g. BOLTON, 2000, Fig. 215 and *P. nannosobek*, our Fig. 4, bottom), and *Strumi-*

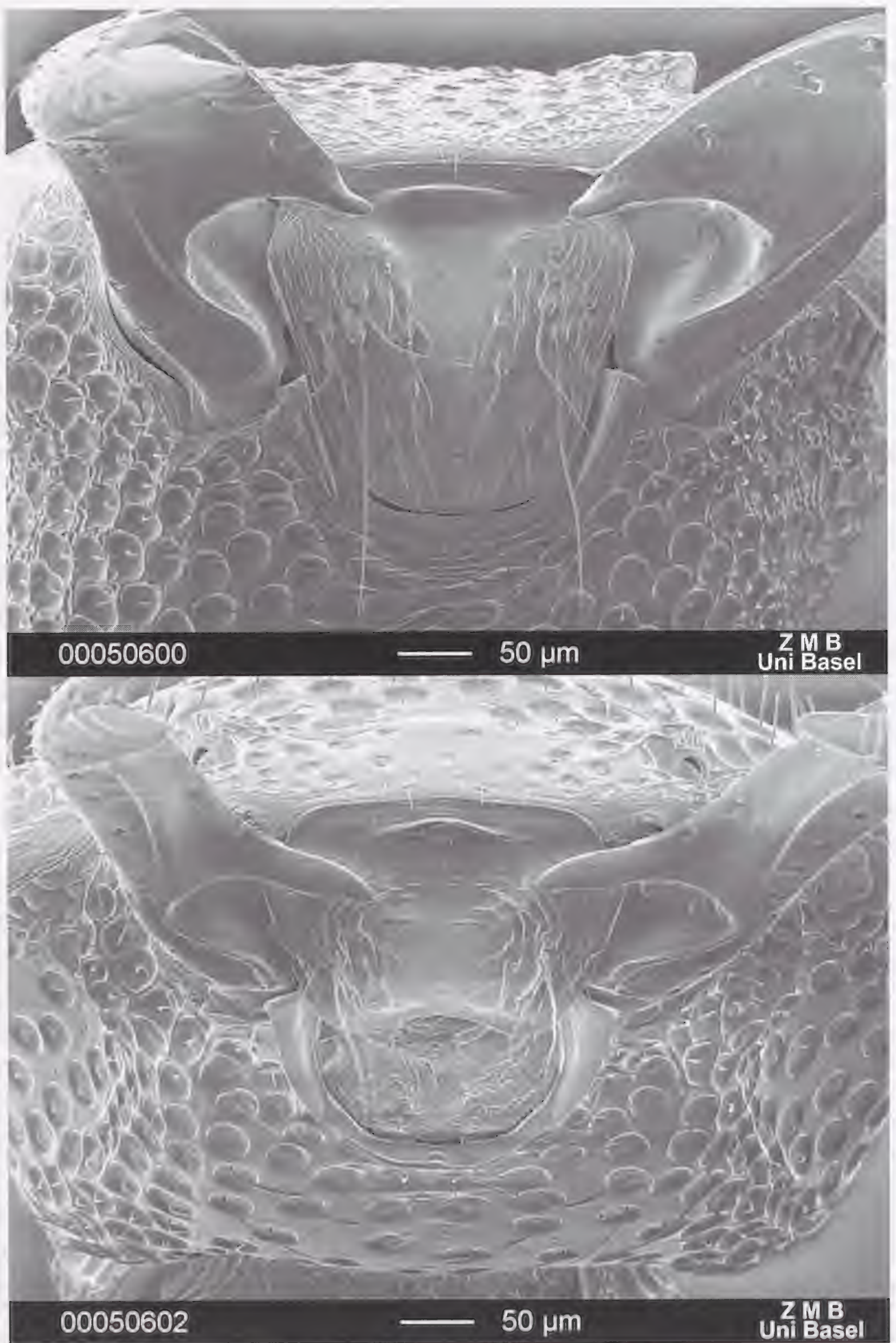


Fig. 30 - Comparable morphology of the labral concavity (a presumed *Epopostruma* synapomorphy) in *Mesostruma turneri* (Forel) (top) and *Epopostruma alata* Shattuck (bottom).

genys (BOLTON, 1999, Fig. 93, and *S. harpyia*, present study). Since there are little doubts about the monophyly of the dacetine genera, a monophyly already supported by a number of synapomorphies, we thought it better to exclude this redundant but questionable character.

DIETZ's (2004) character # 9 "Forma das mandíbulas". Elongated or specialized (i.e. non triangular) mandibles are coded as present in a number of dacetine genera not corresponding to any tribal grouping proposed so far. In addition we'd code as triangular at least the mandibles of *Colobostruma* and of some *Mesostruma* species (see e. g. the figures in BOLTON, 2000). Accepting Dietz's revived combination of *Eurhopalothrix bruchi* in *Rhopalothrix* also the latter genus should have been coded as polymorphic (instead of specialized only). The specialization of the mandibles, moreover, is perfectly correlated with their capacity of engaging apically only or not. As such this character would overweight our character # 10 (q. v.).

DIETZ's (2004) character # 11, "Forma das mandíbulas laminares". Presence or absence of an apical fork is coded in a very subjective way (for instance absence of apical fork in *Daceton*, unknown presence in *Colobostruma*, *Pyramica* and *Microdaceton*) that we are unable of understanding. Since Dietz states that the dacetine apical forks "probably evolved separately" we consider this statement alone as a reason good enough to exclude this character.

DIETZ's (2004) character # 12, "Número de dentes das forquillas apicais". The two-state coding of this character (three vs. four teeth) by Dietz is difficult to maintain and is contradictory even within DIETZ's text and matrix. In DIETZ's table 2, for instance, only *Rhopalothrix* and *Protalaridris* share the four-toothed state, but, according to BROWN (1980, with whom we concur), *Protalaridris* possess only one apical spine and according to the same DIETZ (2004: 187), *Protalaridris* should have a five-toothed fork... Even solving somehow the problem of a correct coding for *Protalaridris*, there are other relevant and pertinent morphologies not accounted for and difficult to classify in this character definition. Examples of such morphologies are the two-toothed fork of *Daceton* (coded "?" by DIETZ, l. c.), the two-toothed and three-toothed fork of *Strumigenys* (coded as three-toothed only by DIETZ, l. c.), a. o.

DIETZ's (2004) character # 32. "Espinhas nos tarsos anteriores". Presence of some undefined type of tarsal spines should be a syn-

apomorphy for the Phalacromyrmecini and Basicerotini, though the author admits that similar but not homologous spines are present also in *Daceton* (and other genera, our study). Fig. 31 shows similarity of structures in *Strumigenys* and *Octostruma*. This and other similar cases encountered during the present study prevent consideration of this character as phylogenetically sound.



Fig. 31 - Tarsal spines in the dacetine *Strumigenys grandidieri* Forel (left) and in the basicerotine *Octostruma balzani* (Emery), a synapomorphy for Basicerotini + Phalacromyrmecini according to DIETZ (2004).

DIETZ's (2004) character # 33. "Hábito de forrageamento". We concur with the description of this character that we consider as plausible in spite of obvious miscoding in Dietz's matrix (e. g. *Pyra-*

mica and *Strumigenys* epigaeic or arboreal only) but we consider our behavioural knowledge of these ants as by far too scanty to allow phylogenetic inferences.

DIETZ's (2004) character # 35. "Asa – conexão de cu-a próximo a 1M (0); distante de 1M basalmente (1); distante de 1M distalmente (2)". State 0 is recorded only among outgroups and state 2 should be autapomorphic for *Eurhopalothrix*. We are unable to see differences in this trait between the wings of the specimens of *E. procera* (Emery) and *Octostruma balzani* (Emery) available to us.

DIETZ's (2004) character # 40. "Presença de asas". This is an autapomorphy of Dietz's outgroup genus *Blepharidatta* (not considered in the present study) and, as such, totally irrelevant in this context.

DIETZ's (2004) character # 41. "Segunda linha de dentes". This is an autapomorphy of the genus *Eurhopalothrix* and, as such, redundant of our character 54 in this context. This trait, moreover,

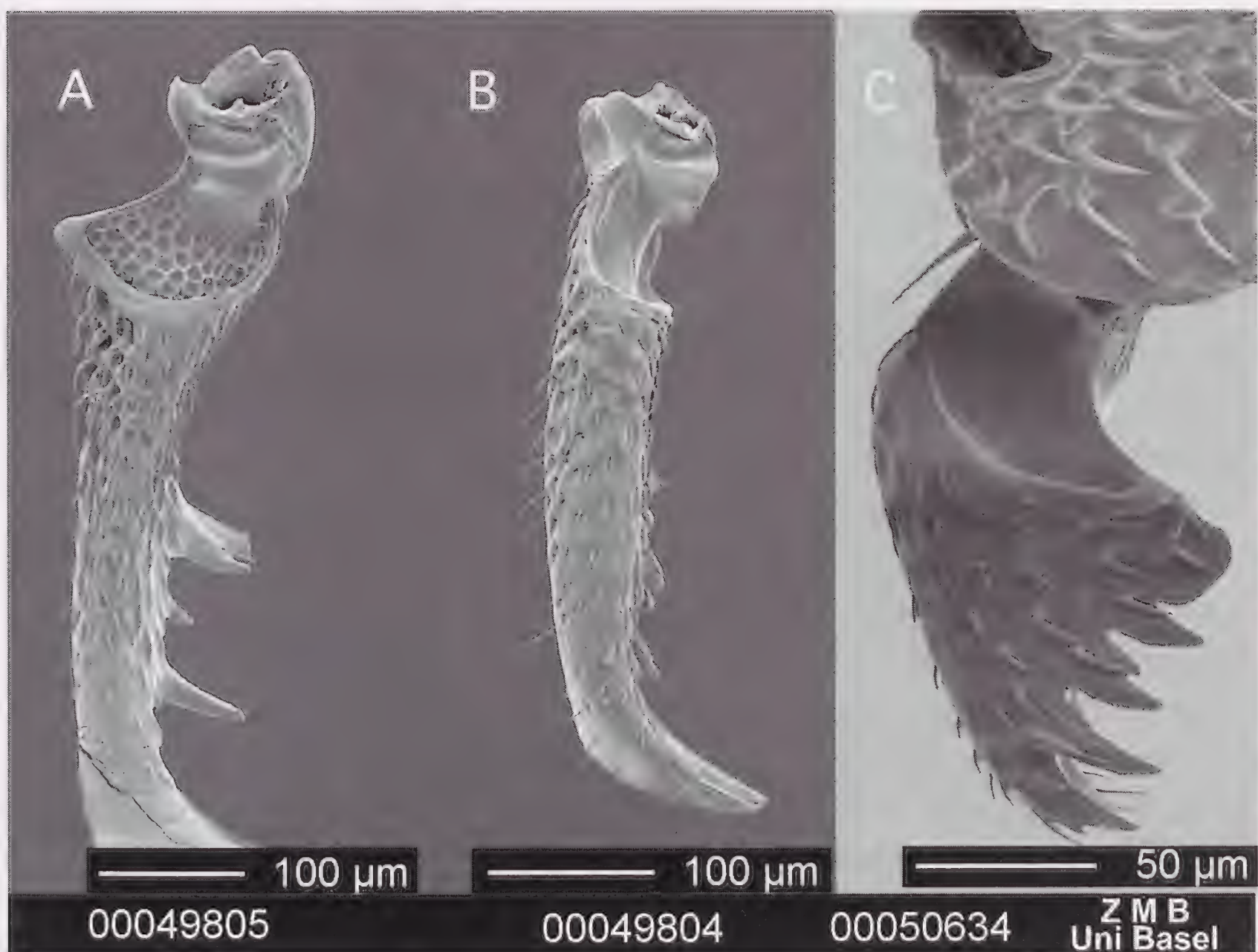


Fig. 32 - Basimandibular depression in *Protalaridris* near *armata* Brown (A), *Rhopalothrix ciliata* Mayr (B) and *Octostruma balzani* (Emery) (C).

is not synapomorphic for *Eurhopalothrix* since it is absent at least in an undescribed “*Eurhopalothrix*” species available for this study and to be described in chapter 6 (Species-level additions) as *Basiceros papuanum* (Fig. 46).

Basimandibular depression absent (0), or present and distally marginate (1). This character (Fig. 32), shared by *Rhopalothrix*, *Protalaridris* and *Talaridris* is mentioned by DIETZ (2004) in the generic descriptions of the first two genera only but is not used in his phylogenetic analysis. We observed it in *Talaridris* as well and a similar structure is visible also in some *Octostruma*. Some *Pyramica* species also have some kind of basimandibular depression.

Larval hairs bifid or not. This is character # 10 of BARONI URBANI & DE ANDRADE (1994). This is a classic synapomorphy for all “dacetiform” genera resulting from the literature but verified in a too small number of taxa to be attributed unmistakable phylogenetic value.

4.3. RESULTS OF THE CLADISTIC ANALYSIS

Our parsimony analysis yields 414 equally shortest trees of length 208 (considering polymorphism as multiple speciation events), Consistency Index (CI) 0.746, Retention Index (RI) 0.785, and Rescaled Consistency Index (RC) 0.592. The strict consensus tree is given in Fig. 33.

Fig. 34 depicts the same consensus tree as the one of Fig. 33 but expressed as phylogram, i.e. with the branch lengths proportional to the number of synapomorphies supporting each branch. In it the synapomorphic characters for each branch are also added to the different branches with the same character numbering as in the previous text. The tree has the same number of branches as the input genera in our data and horizontal square brackets on top of the drawing indicate genera merged as a result of our analysis with their oldest available synonym. Synonymies of genera are inferred on the base of missing or too weak synapomorphies as shown on the tree and discussed in detail under the genus group systematics (chapter 4.5). Weakness and strength of the individual synapomorphies will be judged in terms of Consistency Index and Retention Index on the Consensus Tree of Figs. 33 and 34.

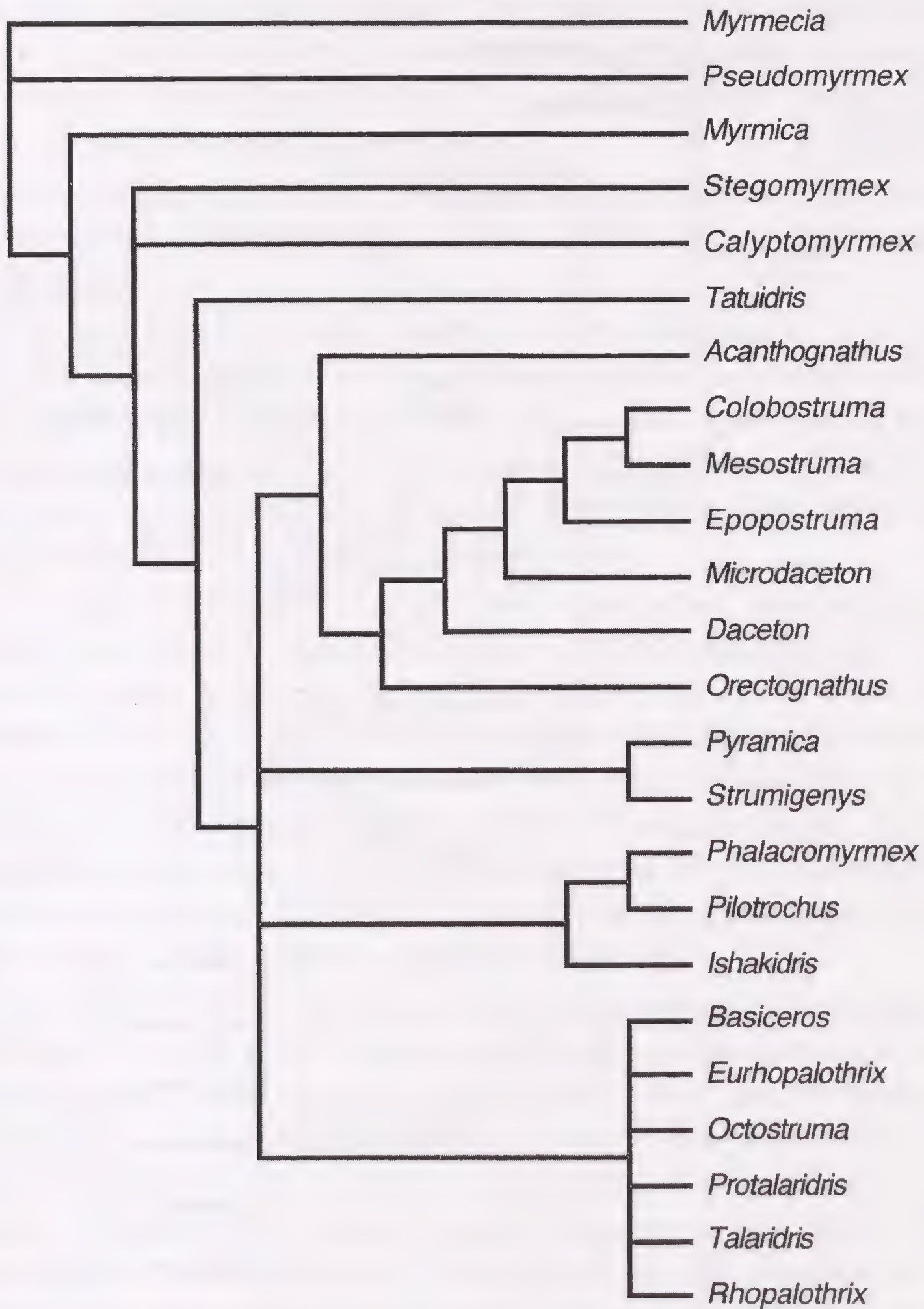


Fig. 33 - Strict consensus tree of the 414 equally most parsimonious trees drawn from the characters and taxa discussed in the text. Length of the individual trees 208.

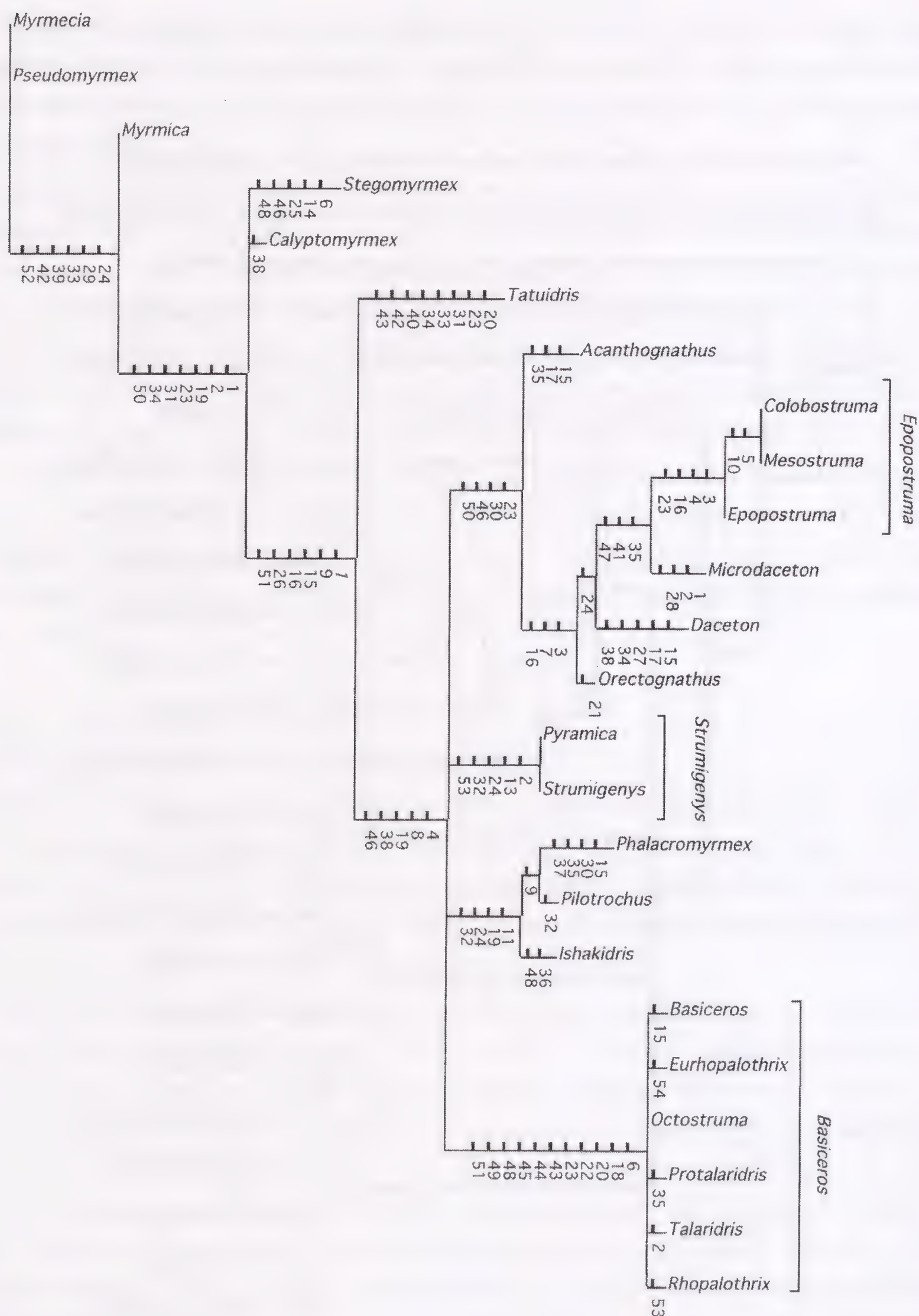


Fig. 34 - Same strict consensus tree as the one of Fig 33 expressed as phylogram, i. e. with the branch lengths proportional to the number of derived characters changing on them. Character numbering as in text. The number of taxa is the same as in the inputted data. The square brackets embracing groups of taxa show synonymies to be proposed in this paper because of missing or too weak synapomorphies for one or more contained genera.

We refrain from attributing great phylogenetic value to this tree. The main reasons for our evaluation are its construction, drawn on a great number of phylogenetically insignificant characters and our incapacity to find better ones. The scarcity and weakness of the known characters on which our phylogeny is based can be better appreciated on the tree of Fig. 35, a 50% majority consensus tree drawn from 100 bootstrap replicates.

The phylogeny of Figs. 33-35, however, is an excellent discriminant criterion to decide what can be actually said or not on dacetine classification.

We insist that a good number of the characters from which our phylogenetic reconstruction is drawn are of doubtful generic or tribal value and are highly variable within the taxa considered. The phylogenetic value of a character may be a rather subjective topic but at least its variability will be described and taken into account in the classificatory scheme proposed below.

Another phylogenetic issue worth discussing here is the plesiomorphic condition of the dacetine mandible morphology. In our former Dacetini study (BARONI URBANI & DE ANDRADE 1994: 11) we contrasted a widespread belief for which elongate mandibles should be the plesiomorphic dacetine state and short mandibles the apomorphic one (BROWN & WILSON, 1959). Our conclusion was based on parsimony evidence drawn from analysis of morphological data and on the effortless consideration that any conceivable Dacetini sister-group should also have short mandibles.

BOLTON (1999: 1644) equated the two terms "long mandibulate" and "short mandibulate" already established in the literature with his "kinetic" and "static pressure mandibles". Our lack of enthusiasm for the use of these terms has been already justified at the beginning of chapter 4.1. But BOLTON (l.c.) adds: "Philip Ward (University of California) has recently added support to the Brown-Wilson hypothesis". This statement is explained by the tracing by Ward of the most parsimonious evolution of the mandibular length on Bolton's own cladogram (BOLTON, 1999: fig. 3). Irrespectively from the quality of the cladogram in question, this result is a straightforward consequence of the nature of the studied sample and wondering about the size of the ancestral mandibles, in this context, would be absurd. In fact, in a 9-taxa tree where all 8 most basal branches

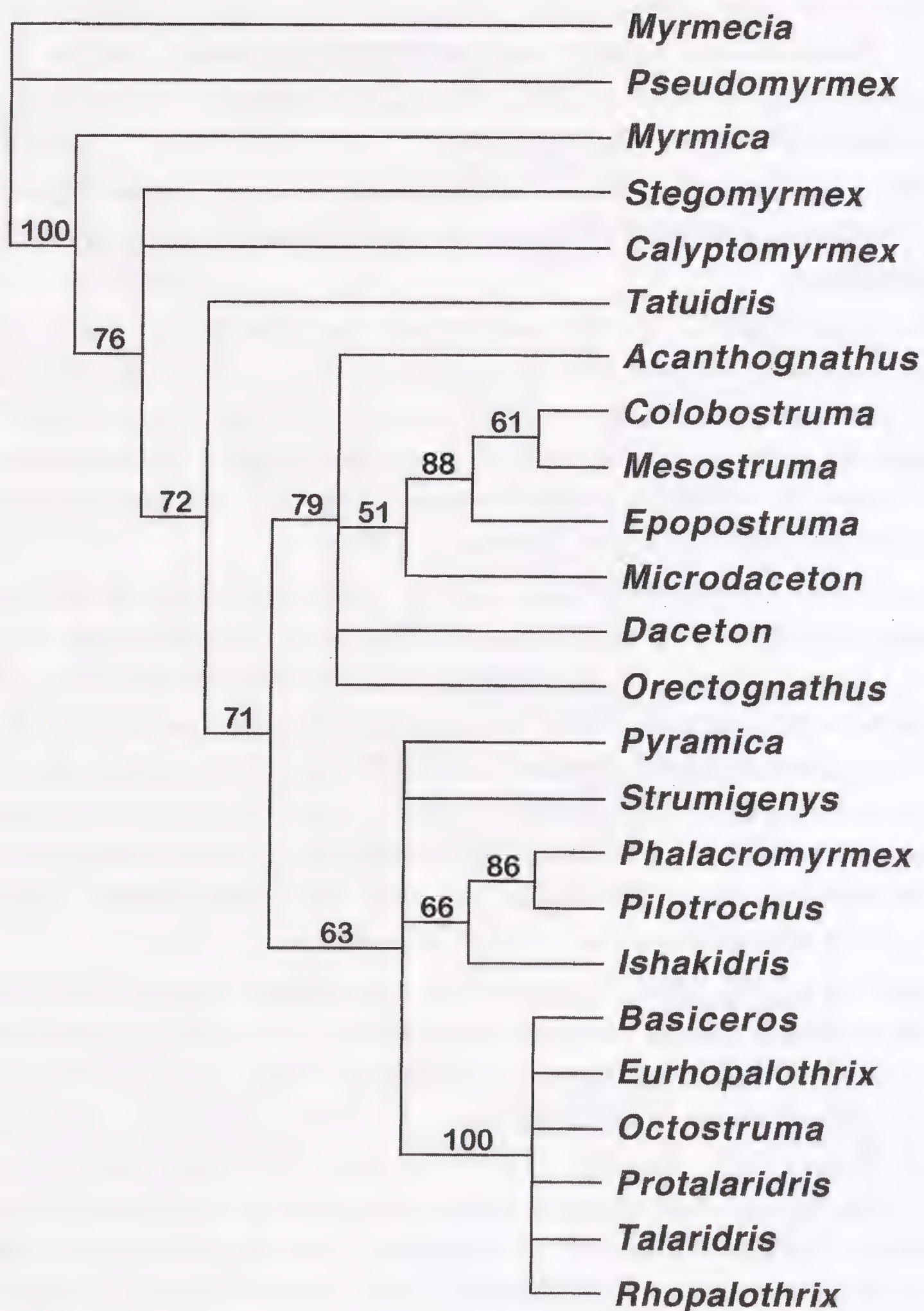


Fig. 35 - 50% Majority Rule consensus tree resulting from 100 bootstrap replicate analyses of the data of Table 1. The figures on the branches give their relative frequencies among the replicates in percent.

represent long mandibulate taxa (as is Bolton's cladogram), there is no arithmetical possibility for the hypothetical common ancestor to be short mandibulate. This conclusion is trivial and the sole hypothetical ancestor worth speculation is not this one but an earlier one connecting the observed long mandibulate clade to the short mandibulate sister clade. Dr. Ward's conclusions, in this case, are either easily predictable and hence unimportant, or erroneous by trying to extrapolate a deduction outside the observed variation range.

Performing again the same analysis on a broader sample of long and short mandibulate taxa like the one considered in the present study, confirms our former hypothesis and the common sense induction that long mandibulate Dacetini should have originated from a short mandibulate ancestor (Fig. 36).

The information contained in the tree of Figs. 33-36 forces to take nomenclatorial action on a number of problems, which, in hierarchically decreasing taxonomic rank, are the following:

4.4. FAMILY-GROUP SYSTEMATICS

Tribe **Agroecomymecini** Carpenter

Agroecomymecini [sic] CARPENTER, 1930: 34. Type genus †*Agroecomymex* by inference. Tribe of Myrmicinae.

Agroecomymecini Carpenter, BROWN & KEMPF, 1968: 184. First correct spelling.

Agroecomymecinae Carpenter, BOLTON, 2003: 51. Subfamily of Formicidae.

BOLTON (1998) lists a set of 7 autapomorphies and 4 plesiomorphies for *Tatuidris* aimed to prove the exclusion of this genus from his "dacetonine tribe-group". Autapomorphies, however, are cladistically uninformative and plesiomorphies cannot be used to infer phylogenetic relationships (see e. g. HENNIG, 1950; WILEY, 1980; and MADDISON & MADDISON, 2002). Later on, BOLTON (2003: 51) places *Tatuidris*, together with two poorly known fossil genera, *Agroecomymex* and *Eulithomymex*, in a new separate subfamily, the Agroecomymecinae. All the characters supposed to characterize and separate the Agroecomymecinae from the Myrmicinae as given by Bolton appear sporadically also among other Myrmicinae genera, though in a convergent way according to BOLTON (l. c.).



Fig. 36 - Same tree as in Figs. 33 & 34 on which the most parsimonious reconstruction of the evolution of the size of the mandibles is traced. Graphic display by accelerated transformation. Contrarily to a common belief supported by BOLTON (1999), long mandibulate Dacetini appear to originate from a short mandibulate ancestor.

The following character states shared by *Tatuidris* with the other myrmicine genera considered for the present study result as plausibly synapomorphic for the whole subfamily Myrmicinae:

1. Promesonotal suture fused (from an unfused ancestor). CI 1.00, RI 1.00. All known myrmicines have a fused promesonotal suture.
2. Petiole dorsoventrally fused (from an unfused ancestor). CI 1.00, RI 1.00. All known myrmicines have a dorsoventrally fused petiole.
3. Loss or fusion of the second radial cell (from an ancestor with recognizable second radial cell). CI 1.00, RI 1.00. Among the ingroup taxa considered in the present study, only *Stegomyrmex* is polymorphic for this trait.
4. Eyes position: lateral (vs. dorsolateral). CI 0.67, RI 0.80. The ancestral position dorsolateral reappears homoplastically among some dacetine taxa.

Since all potentially valid characters tending to exclude *Tatuidris* (and, by inference, *Agroecomymex* and *Eulithomyrmex*) from the Myrmicinae were included in our data matrix and failed to fulfil their supposed role, we feel compelled to re-propose the following rank revival within the Myrmicinae:

Subfam. Myrmicinae: Tribus Agroecomymicini CARPENTER, 1930: 34. Type genus: *Agroecomymex*. **Tribal status revived.**

=Subfamily Agroecomymecinae Carpenter, BOLTON, 2003: 51 (downgraded to tribal rank in the present paper).

And the consequent subfamilial transfers

†*Agroecomymex* WHEELER, 1910: 265 et auctorum omnium recentiorum. Genus ad Myrmicinae. Nec *Agroecomymex*, genus ad Agroecomymicinae, BOLTON, 2003: 51. **Subfamilial transfer.**

†*Eulithomyrmex* CARPENTER, 1935: 91 et auctorum omnium recentiorum. Genus ad Myrmicinae. Nec *Eulithomyrmex*, genus ad Agroecomymicinae, BOLTON, 2003: 52. **Subfamilial transfer.**

Tatuidris BROWN & KEMPF, 1968: 186 et auctorum omnium recentiorum. Genus ad Myrmicinae. Nec *Tatuidris*, genus ad Agroecomymicinae, BOLTON, 2003: 52. **Subfamilial transfer.**

Notice that our conservative appreciation of *Tatuidris* within the Myrmicinae holds in spite of equivalent consideration of all the cladistically informative characters that, according to BOLTON (2003), should prove its exclusion.

In our phylogenetic reconstruction, there are six synapomorphies bringing *Tatuidris* within the Myrmicinae in the same cluster as all the Dacetini and excluding as less related other undoubted Myrmicinae genera like *Myrmica*, *Stegomyrmex*, and *Calyptomyrmex*. These synapomorphies are the following:

1. Mandibles at rest opposing at least in part (instead of crossing). CI 1.00, RI 1.00. This is one of the strongest dacetine synapomorphies.
2. $MTI < 130$ (as opposed to $MTI > 150$). CI 1.00, RI 1.00. This is another strong dacetine synapomorphy.
3. Reduction of the maxillary palps from 2-jointed to 1-jointed. CI 0.85, RI 0.80. The one-jointed condition should be the original dacetine morphology, though a number of dacetine genera and individual species underwent secondarily inverted evolutionary trends.
4. Reduction of the male mandibles. CI 0.75, RI 0.80. This appears to be a general dacetine trait with a few known exceptions in *Pyramica* and *Eurhopalothrix*.
5. Presence of a two-segmented antennal club. CI 0.33, RI 0.71. This appears to be a universal dacetine trait with the sole exceptions of the small genera *Microdaceton*, *Daceton*, and *Orectognathus*.
6. Reduction of the number of antennal joints from 11-12 to 9 or less. CI 0.20, RI 0.50. *Acanthognathus*, *Daceton*, *Phalacromyrmex* and *Basiceros* should represent evolutionary inversions according to our phylogenetic reconstruction, but we already wrote about the doubtful phylogenetic meaning of this character while describing it.

Our result contrasts, however, with the results of a “preliminary analysis” based on sequence data from seven nuclear genes by WARD *et al.* (2005), from a phylogenetic tree inferred from Bayesian posterior probabilities drawn from portions of five nuclear genes and one mitochondrial gene by MOREAU *et al.* (2006a), and from an analogous tree drawn from seven nuclear gene fragments by BRADY

et al. (2006a). According to these results, *Tatuidris* should belong to a clade opposed to most other known ants.

We believe that two important aspects of these results should be remembered.

The first is that assuming that molecular-drawn phylogenies are always correct or at least better than morphology based ones – as several myrmecologists seem to believe – is equivalent to the belief that all computer-drawn results must be true. BRADY *et al.* (2006b: Table 7) unfortunately omit fossil-based minimum ages for the Dacetini from their data but (2006a:1) point out correctly to “apparent conflicts between fossil, morphological, and molecular data”. Actually, the main source of conflict among this triplet of factors is the molecular data. We consider as alarming the fact that genetic similarity measures contradict both, obvious morphological similarity suppositions and morphology-based parsimony measures.

Second, molecular data are radically different from morphological data by the difficulty of arguing in favour or against their results. Morphological results may appear more or less plausible according to the characters on which they are drawn, but the sole chance to discuss the validity of results obtained from molecular data is to compare them with results obtained from morphological data (the so-called congruence criterion). It is obvious that in this case there is total lack of congruence between the available molecular and morphological information. Both aspects need to be further improved.

We assume, moreover, that the differences within the most recent molecular ant phylogenetic reconstructions by BRADY (2003), OHNISHI *et al.* (2003), ASTRUC *et al.* (2004), SAUX *et al.* (2004), WARD *et al.* (2005), MOREAU *et al.* (2006a), and BRADY *et al.* (2006a), should be sufficient to impose some prudence before blindly preferring molecular to morphological results.

However interesting the *Tatuidris* molecular outcome may be, we consider it as Dr. Ward, co-author of two of the previously cited molecular analyses (WARD *et al.*, 2005; BRADY *et al.*, 2006a), considered it in a recent web document (WARD, 2005), where he writes that *Tatuidris* “are rather specialized ants, and it seems plausible to me [i. e. P. S. Ward] that their divergent evolution includes extreme modification of the myrmicine groundplan”. In the analysis by MOREAU *et al.* (2006a) and BRADY *et al.* (2006a), *Tatuidris* appears

as the sister genus of *Paraponera*, a phylogenetic position difficult to digest when considering our present morphological understanding of these two genera.

This presumed strict phylogenetic relationships between *Tatuidris* and *Paraponera*, however, is based on Bayesian posterior probabilities, while maximum likelihood bootstrap (MOREAU *et al.*, 2006a) and maximum parsimony bootstrap analyses (MOREAU *et al.*, 2006a; BRADY *et al.*, 2006b) failed to support the presumed sister pair (*Tatuidris*, *Paraponera*) and any of the nodes intermediate between this pair and the basal node of Formicidae (MOREAU *et al.*, 2006b).

We wish that these results, at this stage, will be considered as a stimulating molecular challenge to our organismic knowledge of ants.

Within our data set, assignment of *Tatuidris* to a unique clade with the other dacetines is supported by 72% of the bootstrap replicates and its classification among Myrmicinae by 100% bootstrap replicates (Fig. 35), confirming in this way WARD's (2005) morphologically based intuitive hypothesis.

Our data, nonetheless, might be insufficient to take a durable decision about the monophyly or diphyly of the opposable mandibles among the Myrmicinae. Our cladogram of Fig. 33 strongly suggests a unique origin of the mandible opposability. But we are aware that to obtain a firmer certainty (supported e. g. by high bootstrap frequencies) one might need to consider all myrmicine genera and many more additional characters. Once the sister-group relationship between the dacetines and the agroecomyrmicines will be confirmed, considering them as two separate tribes or only one tribe becomes irrelevant and just a matter of taste and a phylogenetically irrelevant issue. The poor characterization of the tribe Dacetini (q. v.) after exclusion of the Agroecomyrmecini may be considered as an argument in favour of merging the two tribes together. We maintain the two tribes separate in this paper, at least provisionally, in order to promote nomenclatorial stability.

Assuming that the characters observed in the extant *Tatuidris* can be attributed by inference to the two fossil genera *Agroecomyrmx* and *Eulithomyrmex*, the tribe Agroecomyrmecini is characterized by the two following uniquely derived characters:

Petiole tergum and sternum in posterior view differently shaped (CI 1.00, RI 0.00).

Eyes at the posterior border of the antennal scrobe (CI 0.71, RI 0.83).

BOLTON (1998, 2003) lists other potentially autapomorphic characters not considered for the present analysis since they are parsimony uninformative but which may prove useful in further diagnosing these ants as a separate tribe.

Tribe **Dacetini** Forel

Dacetonini FOREL, 1892: 344. Type genus *Daceton* Perty, by inference. Tribe of Myrmicinae.

<Dacetonini Forel, BOLTON, 1998: 71.

Dacetonii FOREL, 1893a: 164.

Dacetii Forel, EMERY, 1895c: 770.

Dacetini Forel, EMERY, 1914: 34 & 39.

Dacetiti BROWN, 1952: 10. Type genus: *Daceton* Perty, by original designation. BARONI URBANI & DE ANDRADE, 1994: 9. Junior synonym of Dacetini.

Dacetini Forel, BARONI URBANI & DE ANDRADE, 1994: 9.

<Dacetini Forel, BOLTON, 2000: 12.

Basicerotini BROWN, 1949c. Type genus *Basiceros* Schulz by inference. **Synonymy reinstated.**

Basicerotini BROWN, BARONI URBANI & DE ANDRADE, 1994: 10. Junior synonym of Dacetini.

Basicerotini BROWN, BOLTON, 1998: 70. Tribe of Myrmicinae.

Arestognathiti BROWN, 1952: 10. Misspelling for Orectognathiti.

Orectognathiti BROWN, 1952: 10. Type genus: *Orectognathus* Smith, by original designation. BARONI URBANI & DE ANDRADE, 1994: 9. Junior synonym of Dacetini.

Epopostrumiti BROWN, 1952: 10. Type genus: *Epopostruma* Forel, by original designation. BARONI URBANI & DE ANDRADE, 1994: 9. Junior synonym of Dacetini.

Strumigeniti BROWN, 1952: 10. Type genus: *Strumigenys* Forel, by original designation. BARONI URBANI & DE ANDRADE, 1994: 9. Junior synonym of Dacetini.

Phalacromyrmecini WHEELER & WHEELER, 1976: 60. Unavailable name.

Phalacromyrmecini DLUSSKY & FEDOSEEVA, 1988: 80. First available name (reference to a description). Type genus *Phalacromyrmex* Kempf by inference. **Synonymy reinstated.**

Phalacromyrmecini, BARONI URBANI & DE ANDRADE, 1994: 10. Junior synonym of Dacetini.

Phalacromyrmecini, BOLTON, 1994: 106. Tribe of Myrmicinae.

Basicerotini is a junior synonym of Dacetini.

The possibility to separate from the remaining Dacetini a small set of peculiar genera corresponding to the Basicerotini was already considered and discarded by EMERY (1924: 313) who wrote:

“Un premier groupe comprend les genres à fosses antennaires placées au-dessus des yeux: *Acanthognathus*, *Microdaceton*, *Orectognathus*, *Strumigenys*, *Pentastroma*, *Epitritus* (*Acanthognathus* a la scrobe réduite à peu près de rien).

Un deuxième groupe comprend les genres *Basiceros*, *Rhopalothrix* et *Epopostruma*, qui ont la scrobe placée au dessus de l’œil. ...

Le genre *Daceton*, bien qu’il ait l’arête frontale prolongée un peu au dessous de l’œil, me semble se rattacher au premier groupe”.

When BROWN (1949c) separated along the same line as EMERY (1924) his new tribe Basicerotini, he did not use the relative position of the antennal scrobe to define it but referred only to some differences in hair morphology. BARONI URBANI & DE ANDRADE (1994) proposed the synonymy of Basicerotini with Dacetini after showing the inconsistency of this character.

BOLTON (1998) apparently agreed with this since he abandoned all references to the hair morphology but revived the tribe Basicerotini on the base of 10 newly defined synapomorphies. One of them is the position of the antennal scrobe already described and discarded by EMERY (1924). All BOLTON’s (1998) characters are either considered for the present analysis or excluded from the analysis after justification of their exclusion.

Here we propose again that the name Basicerotini should be considered as a junior synonym of Dacetini for a cladistic reason, a practical reason, and several general taxonomic reasons.

The cladistic reason is that maintaining the Basicerotini as a tribe separate from the Dacetini would render the first paraphyletic to the second or, at least to the Dacetini as they are understood by Bolton (see Fig. 32).

The practical reason is well exemplified by the case of *Rhopalothrix inopinata* de Andrade, a species originally described as a basicerotine and now transferred to the dacetine *Strumigenys* in spite of the fact that its sole clearly visible synapomorphic character is a basicerotine character (see later under the treatment of *Strumigenys*).

The general taxonomic reasons are that the homogeneity of the morphological boundaries of this hypothetical tribe result much less precise than what is commonly accepted for valid ant tribes. The following analysis of all eleven potentially synapomorphic traits of the Basicerotini should further justify our appreciation.

- Base of scape bent at right angle. CI 1.00, RI 1.00. Universal among the Basicerotini, a similar scape is known also for a few Dacetini species of the genera *Colobostruma* and *Pyramica*.
- Antennal fossa separate from the antennal scrobe. CI 1.00, RI 1.00. The separation is indistinct in the basicerotines *Eurhopalothrix bruchi* and *E. heliscata*. On the contrary the antennal fossa and scrobe are clearly separate in some *Strumigenys*, *Pyramica*, and *Colobostruma*.
- Pretergite of the first gastral segment sessile. CI 1.00, RI 1.00. Formally this character state, considered as plesiomorphic by BOLTON (1998), is the sole unequivocal synapomorphy of the Basicerotini. This prominent position in our character analysis is derived essentially from our coding of it. BOLTON (1998: 72) considered the complementary state of this same trait (i. e. pretergite neck-like) as synapomorphic for his Dacetini + Phalacromyrmecini.
- First gastral segment densely punctuated. CI 1.00, RI 1.00. There are a few *Eurhopalothrix* and *Octostruma* species with the first gastral segment smooth. On the other hand some *Stegomyrmex* and *Pyramica* species have a definitely punctuated first gastral segment.
- Hypertrophied torulus. CI 0.83, RI 0.83. A hypertrophied torulus can be found also in some scattered species of *Pyramica*, *Strumigenys*, *Mesostruma*, *Colobostruma* and *Tatuidris*.
- Labrum with transversal groove. CI 0.80, RI 0.83. This trait, universal within the Basicerotini, is found also in some *Pyramica*, *Strumigenys* and *Colobostruma* species among Dacetini s. str., and in *Stegomyrmex*.
- Male mandibles not reduced in size. CI 0.75, RI 0.80. Most (not all) known dacetine and agroecomyrmeine males underwent a reduction of the mandibles that should have secondarily re-grown among most (not all) known basicerotine males. The paucity of known males of these ants parallels the plausibility of this hypothesis.
- Postpetiolar presclerites arising from a deep concavity. CI 0.67, RI 0.86. As we already wrote in the characters' description, this same morphology is known also for some *Pyramica* species.
- Base of first gastral sternum truncate. CI 0.67, RI 0.71. Originally defined by BOLTON (1999) as synapomorphic for *Strumige-*

nys and *Pyramica*, in addition than among all basicerotines, this character state is present also in *Ishakidris*, *Stegomyrmex*, and in some but not all *Colobostruma*, *Pyramica*, and *Strumigenys* species.

- Antennal scrobe below the eyes. CI 0.60, RI 0.83. This trait, constant among basicerotines, is shared with the dacetines *Colobostruma*, *Mesostruma*, and *Epopostruma*.
- Articulation between gaster and postpetiole broad. CI 0.33, RI 0.66. The complementary state of this character (i. e. articulation narrow) was originally proposed by BOLTON (1998:72) as potentially synapomorphic for the Dacetini + Phalacromyrmecini. On the contrary, within the Basicerotini the articulation can be narrow in some *Basiceros* and outside them it is broad in *Tatuidris* and in some *Pyramica* and *Strumigenys*.

One should not forget that the goodness of fit of some of the above traits on the resulting phylogeny and classification as shown by high CI values is a trivial product of our coding these traits as invariant among in- and/or out-group taxa as Bolton did. As a matter of fact, exceptions to these *a priori* homogeneity (= monophyly) hypotheses are regularly described and photographically documented in our initial characters' description (chapter 4.1).

Phalacromyrmecini is a junior synonym of Dacetini.

The first to recognize similarities between the three genera included in this tribe, i. e. *Phalacromyrmex*, *Ishakidris*, and *Pilotrochus*, was BOLTON (1984) who wrote that there is "no advantage to adding yet another formal [i.e. tribal] name to the confusion". In this paper these genera were correctly compared with the dacetine genus *Glamyromyrmex* (= *Pyramica*). The name Phalacromyrmecini was introduced without definition or description by WHEELER & WHEELER (1976) and repeated (among others) by DLUSSKY & FEDOSEEVA (1988) who rendered the name available by referring to BOLTON's (1984) description (International Code of Zoological Nomenclature 13 (a) (ii)).

BARONI URBANI & DE ANDRADE (1994) considered the Phalacromyrmecini as a junior synonym of Dacetini. Unexpectedly, this view was immediately contrasted by BOLTON (1995) without giving

reasons for it and later by BOLTON (1998) who defined the tribe by means of three synapomorphies. In the present paper we already showed that one of them (presence of a katepisternal groove) was artificially introduced by BOLTON (1998) only to support separation of the Phalacromyrmecini. In a former paper, in fact, BOLTON (1984) uses the presence of this same character in *Ishakidris* to differentiate it from the other two genera now attributed to the Phalacromyrmecini where the groove is absent.

Other potential “Phalacromyrmecini” synapomorphies evidenced by our analysis are the following:

- Mandibles with alternating small and large teeth. CI 1.00, RI 1.00. If there is no variation of this character within the tribe (one should remember perhaps that this tribe comprises only three species classified in three different monotypic genera), mandibles with teeth alternating in size are known also in an equivalent number of *Pyramica* and *Octostruma* species (see our character description). The high CI and RI values of this character, hence, are due to our following Bolton’s interpretation of it totally ignoring ascertained outgroup variability (see p. 24 for our discussion of char. # 11).
- Mesosternal hair beds visible. CI 0.91, RI 0.67. We reaffirm that the consistency of this character state within this pretended three-species tribe is due to the exiguity of species included in the tribe. The same character state is widespread among Dacetini and Basicerotini sensu BOLTON (1998) and was used also as a synapomorphy for *Strumigenys* and *Pyramica* by BOLTON (1999).
- Eyes ventral. CI 0.67, RI 0.80. Another trait shared with *Strumigenys* and *Pyramica* as well.
- Clavate scape. CI 0.50, RI 0.60. A clavate scape is known also in *Stegomyrmex*, *Calyptomyrmex*, *Tatuidris*, and some *Pyramica* species.

Each of these characters has a variability outside this three-species tribe far beyond what is normally accepted for other ant tribes.

BOLTON’s (2006) additional argument in favour of retaining the Phalacromyrmecini, i.e. absence of the basimandibular process is untenable. In fact the presence of the process is supposed to be

apomorphic for the Dacetini and as BOLTON (l. c.) states, its absence among Phalacromyrmecini is “presumably plesiomorphic”.

Limits and definition of the Dacetini

After merging the Basicerotini and the Phalacromyrmecini in it, the tribe Dacetini may be characterized by the following five potential synapomorphies, only the first of which, in our opinion, can be considered phylogenetically relevant.

- Presence of “trigger hairs”. CI 1.00, RI 1.00. We wrote earlier in this paper that the dacetine “trigger hairs”, as used by BOLTON (1998) and in the present study may be homologous in function but they are obviously not homologous in morphology when they arise from different sclerites. Nonetheless, in spite of being widespread among Dacetini, at least a few *Colobostruma* and *Pyramica* species are deprived of such hairs. Given their rarity, these cases could be interpreted as secondary losses.
- Labrum not capable of full reflexion. CI 0.50, RI 0.87. This character matches perfectly its scope as dacetine synapomorphy, except for its absence in *Colobostruma*, *Mesostruma* and *Epopostruma*.
- Scape subcylindrical. CI 0.50, RI 0.60. We already discussed the phylogenetic meaning of this character for its alternative state (scape clavate) as potential synapomorphy for the Phalacromyrmecini.
- Presence of limbus. CI 0.50, RI 0.80. Evidentiation of this character seems to be an artefact of character optimization. The limbus, in fact, is absent among several Dacetini genera although it is present only in *Stegomyrmex* outside this clade.
- Propodeal spiracle close to propodeal declivity. CI 0.33, RI 0.60. The spiracle is at about midlength of the sclerite in *Daceton* and, among the outgroups, it is again close to the declivity in *Calypatomyrmex*.

The above synapomorphic weaknesses of the Dacetini repropose the opportunity of separating them from the Agroecomyrmecini. If, on one hand, there is no doubt that only one Dacetini tribe including the Agroecomyrmecini would automatically result much better defined and stable, we see no urgent practical reasons to take this decision immediately.

4.5. GENUS-GROUP SYSTEMATICS

In the following taxa discussion we shall report only the most recent or the most significant references and synonyms. A more exhaustive list of the older ones can be found in BARONI URBANI & DE ANDRADE (1994), BOLTON (1995) and BOLTON (2000).

All our classificatory inferences are drawn from our Fig. 33, which, we repeat, we consider essentially as an operational picture of our factual Dacetini knowledge.

The following ingroup genera, listed in alphabetical order, appear as actually or potentially taxonomically sound by possessing one or more plausible synapomorphy each:

Acanthognathus Mayr

Acanthognathus MAYR, 1887: 567. Type species *Acanthognathus ocellatus* Mayr by monotypy.

Synapomorphies resulting from our analysis:

Worker (and gyne) metapleural gland very close to propodeal spiracle. CI 0.62, RI 0.40. This trait appears also in *Epopostruma*, *Microdaceton*, *Protalaridris*, a. o. as coded also by BOLTON (1999, Table 1) for his Dacetonini.

Worker (and gyne) scape straight at base. CI 0.50, RI 0.33. The straight condition of *Acanthognathus* is shared with *Daceton*.

Worker (and gyne) antennae 11-jointed. CI 0.20, RI 0.50 for the 11-12 jointed state.

This list, however, does not evidentiate the main synapomorphy for the species of the genus, i.e. our char. #13, state 2, the basimandibular process long and apically bifurcated. The reason for this omission is a purely logical pitfall: since state #2 appears only in *Acanthognathus* and state #1 is present in all the other genera of the clade, it is impossible to ascertain whether the ancestor of the whole clade presented state #1 or #2 and hence if #2 is exclusive of *Acanthognathus* or common to *Acanthognathus* and the hypothetical ancestor of the whole clade.

The extant *Acanthognathus* species were revised and keyed by BROWN & KEMPF (1969). Afterwards BARONI URBANI & DE ANDRADE (1994) described one fossil species from Dominican amber.

***Basiceros* Schulz**

Ceratobasis SMITH, 1860: 78. Type species *Meranoplus singularis* Smith by monotypy.
Nec *Ceratobasis* Lacordaire, 1848 (Coleoptera).

Basiceros SCHULZ, 1906: 156 (replacement name for *Ceratobasis*).

Aspididris WEBER, 1950: 3. Type species *Aspididris militaris* Weber by monotypy.
Synonymy by BROWN, 1974: 132.

Creightonidris BROWN, 1949c: 89. Type species *Creightonidris scambognatha* Brown by original designation. Synonymy by DIETZ, 2004: 48.

Rhopalothrix MAYR, 1870: 415. Type species *Rhopalothrix ciliata* Mayr designated by WHEELER, 1911b: 172. **New synonymy.**

Heptastruma WEBER, 1934: 54. Type species *Heptastruma wheeleri* Weber by original designation. Synonymy with *Rhopalothrix* by BROWN & KEMPF, 1960: 230. **New synonymy.**

Acanthidris WEBER, 1941: 188. Type species *Acanthidris isthmicus* Weber by original designation. Synonymy with *Rhopalothrix* by BROWN & KEMPF, 1960: 230. **New synonymy.**

Rhopalothrix subg. *Octostruma* FOREL, 1912b: 196. Type species *Rhopalothrix simoni* designated by WHEELER, 1913: 82. **New synonymy.**

Octostruma Forel, BROWN, 1948: 102.

Talaridris WEBER, 1941: 184. Type species *Talaridris mandibularis* Weber by original designation. **New synonymy.**

Eurhopalothrix BROWN & KEMPF, 1960: 202. Unavailable name without designation of type species.

Eurhopalothrix BROWN & KEMPF, 1961: 44. Type species *Rhopalothrix bolau* Mayr by original designation. **New synonymy.**

Protalaridris BROWN, 1980: 36. Type species *Protalaridris armata* Brown by original designation. **New synonymy.**

The genus *Basiceros* may be identified and characterized by the set of synapomorphies that we already listed and discussed for the tribe Basicerotini. If tribal rank for them appears exaggerated to say the least, recognizing to these synapomorphies generic rank seems to be more plausible and satisfactory.

No explicit synapomorphy characterizes *Basiceros*. The good score of the pretergite of the first gastral segment sessile (as opposed to pedunculate) is due essentially to our coding of it. See our Fig. 27 as an example in which this character can not be detected.

Other useful but also not universally distributed characters are:

- Antennal fossa separate from the antennal scrobe. Exceptions *Basiceros* (= *Eurhopalothrix* = *Rhopalothrix*) *bruch*i and *heliscatum*. This trait is present also in other Dacetini outside the clade (species of *Strumigenys* and *Epopostruma*).

- First gastral segment densely punctuated. Exceptions *Basiceros* (= *Octostruma*) *balzani* and *onorei*. This trait is present also in some *Strumigenys*.

We are aware that even after downgrading the tribe Basicerotini to genus level, the ensuing genus *Basiceros* results more ill-defined than most other ant genera, but we regard the present proposal as the one coupling the minimum nomenclatorial change with the maximum practical utility.

All the new genus-level synonymies above flow directly either from the total lack of synapomorphies or from the implausibility of the known ones as they result in our Fig. 34. These “genera”, however, are present in a number of practical keys where they are separate on the basis of the number of antennal joints. By being a meristic character, transitional forms in antennomere counts cannot be expected and this makes such counts excellent practical characters. Their poor phylogenetic value was already stressed explicitly or implicitly by BOLTON (1999), DIETZ (2004) and ourselves (present paper) by coding their 8-steps variability in a reduced binary form only.

Further evidence for the generic synonymies proposed above results from the following critical summary of all known but insufficient synapomorphies on which these generic names were based:

Rhopalothrix: loss of the anal vein. CI 0.75, RI 0.50. Besides the reduced number of known wing venations in the whole tribe, the anal vein is missing also in some *Eurhopalothrix*, *Strumigenys*, and *Acanthognathus*.

Octostruma: no synapomorphies for this genus result from our data.

Talaridris: reduction of the number of labial palps from two to one CI 0.70, RI 0.67. One-jointed labial palps are known, among others, also in *Strumigenys*, *Acanthognathus*, *Basiceros*, *Eurhopalothrix* and *Octostruma*. The apomorphic condition attributed to *Talaridris* is a consequence of the fact that one-jointed palps are a secondary reduction from 2 jointed, the state assigned to the ancestor of the whole clade.

Eurhopalothrix: loss of the pterostigma. CI 1.00, RI 0.00. This is a potentially excellent character discovered by DIETZ (2004). Note that DIETZ (l. c.) was able to study the males of 7 *Eurhopalothrix*

out of a total of 39 known species and that he examined gynes of 29 species, although it is not specified if these were all winged or not. DIETZ (2004: 34) adds also presence of a second row of mandibular teeth [among gynes] as apomorphic for *Eurhopalothrix* but the gyne of *Basiceros papuanus* n. sp. (a species with 7 antennal joints - as *Eurhopalothrix* should be - to be described later in the present paper) has no trace of the second row of teeth. Assuming that *Eurhopalothrix* could be separate from the other genera discussed here on the basis of the lack of pterostigma, *Basiceros* would result paraphyletic to it.

Protalaridris: metapleural gland bulla close to the annulus. CI 0.62, RI 0.40. This same character state re-appears in some *Eurhopalothrix*, *Octostruma* and in a number of other, less related Dacetini.

The generic synonymies above imply the following new combinations:

Note: The name *Basiceros* is composed of the two Greek words "βάσις" (=basis, foot), feminine, and "κέρας" (=horn), neuter. It is hence a neuter noun and established species names like *singularis* or *militaris* must be changed to *singulare* and *militare*.

Basiceros acutipilis (Kempf). **New combination** for *Rhopalothrix acutipilis* KEMPF, 1962: 28.

Basiceros allopeciosum (Brown & Kempf). **New combination** for *Eurhopalothrix allopeciosa* BROWN & KEMPF, 1960: 206.

Basiceros apharogonium (Snelling). **New combination** for *Eurhopalothrix apharogonia* SNELLING, 1968: 1.

Basiceros armatum (Brown). **New combination** for *Protalaridris armata* BROWN, 1980: 37.

Basiceros australe (Brown & Kempf). **New combination** for *Eurhopalothrix australis* BROWN & KEMPF, 1960: 218.

Basiceros balzani (Emery). **New combination** for *Rhopalothrix balzani* EMERY, 1894: 217 and *Octostruma balzani* (Emery), BROWN, 1949c: 92.

Basiceros batesi (Emery). **New combination** for *Rhopalothrix batesi* EMERY, 1894: 218 and *Octostruma batesi* (Emery), BROWN, 1949c: 92.

Basiceros betschi (Perrault). **New combination** for *Octostruma betschi* PERRAULT, 1988: 303.

Basiceros biroi (Szabó). **New combination** for *Rhopalothrix biroi* SZABÓ, 1910: 365 and *Eurhopalothrix biroi* (Szabó), BROWN & KEMPF, 1960: 222.

Basiceros bolaii (Mayr). **New combination** for *Rhopalothrix bolaii* MAYR, 1870: 415 and *Eurhopalothrix bolaii* (Mayr), BROWN & KEMPF, 1960: 210.

Basiceros brevicorne (Emery). **New combination** for *Rhopalothrix brevicornis* EMERY, 1897: 572 and *Eurhopalothrix brevicornis* (Emery), BROWN & KEMPF, 1960: 215.

Basiceros browni (Taylor). **New combination** for *Eurhopalothrix browni* TAYLOR, 1990: 404.

Basiceros bruchi (Santschi). **New combination** for *Rhopalothrix bruchi* SANTSCHI, 1922: 256 and *Eurhopalothrix bruchi* (Santschi), BROWN & KEMPF, 1960: 214.

Basiceros caledonicum (Brown & Kempf). **New combination** for *Eurhopalothrix caledonica* BROWN & KEMPF, 1960: 220.

Basiceros chapmani (Taylor). **New combination** for *Eurhopalothrix chapmani* TAYLOR, 1990: 406.

Basiceros ciliatum (Mayr). **New combination** for *Rhopalothrix ciliata* MAYR, 1870: 415.

Basiceros cinnameum (Taylor). **New combination** for *Eurhopalothrix cinnamea* TAYLOR, 1970: 50.

Basiceros clypeatum (Brown & Kempf). **New combination** for *Eurhopalothrix clypeata* BROWN & KEMPF, 1960: 205.

Basiceros coronatum (Taylor). **New combination** for *Eurhopalothrix coronata* TAYLOR, 1990: 407.

Basiceros depressum (Ketterl *et al.*). **New combination** for *Eurhopalothrix depressa* KETTERL *et al.*, 2004: 45.

Basiceros diadema (Brown & Kempf). **New combination** for *Rhopalothrix diadema* BROWN & KEMPF, 1960: 239.

Basiceros dubium (Taylor). **New combination** for *Eurhopalothrix dubia* TAYLOR, 1990: 409.

Basiceros emeryi (Forel). **New combination** for *Rhopalothrix emeryi* FOREL, 1912a: 58 and *Eurhopalothrix emeryi* (Forel), BROWN & KEMPF, 1960: 230.

Basiceros floridanum (Brown & Kempf). **New combination** for *Eurhopalothrix floridana* BROWN & KEMPF, 1960: 207.

Basiceros grave (Mann). **New combination** for *Rhopalothrix gravis* MANN, 1922: 40 and *Eurhopalothrix gravis* (Mann), BROWN & KEMPF, 1960: 211.

Basiceros greensladei (Taylor). **New combination** for *Eurhopalothrix greensladei* TAYLOR, 1968a: 342.

Basiceros heliscatum (Wilson & Brown). **New combination** for *Eurhopalothrix heliscata* WILSON & BROWN, 1985: 410.

Basiceros hoplites (Taylor). **New combination** for *Eurhopalothrix hoplites* TAYLOR, 1980b: 231.

Basiceros iheringi (Emery). **New combination** for *Rhopalothrix Iheringi* EMERY, 1888: 361 and *Octostruma iheringi* (Emery), BROWN, 1949c: 92.

Basiceros impressum (Palacio). **New combination** for *Octostruma impressa* PALACIO, 1997: 411.

Basiceros inca (Brown & Kempf). **New combination** for *Octostruma inca* BROWN & KEMPF, 1960: 185.

Basiceros insidiator (Taylor). **New combination** for *Eurhopalothrix insidiatrix* TAYLOR, 1980b: 238.

Basiceros isabellae (Mann). **New combination** for *Rhopalothrix isabellae* MANN, 1919: 357 and *Eurhopalothrix isabellae* (Mann), BROWN & KEMPF, 1960: 225.

Basiceros isthmicum (Weber). **New combination** for *Acanthidris isthmicus* WEBER, 1941: 188.

Basiceros jennya (Taylor). **New combination** for *Eurhopalothrix jennya* TAYLOR, 1990: 413.

Basiceros kusnezovi (Brown & Kempf). **New combination** for *Rhopalothrix kusnezovi* BROWN & KEMPF, 1960: 238.

Basiceros lenkoi (Kempf). **New combination** for *Eurhopalothrix lenkoi* KEMPF, 1967: 358.

Basiceros omnivagum (Taylor). **New combination** for *Eurhopalothrix omnivaga* TAYLOR, 1990: 413.

Basiceros orbis (Taylor). **New combination** for *Rhopalothrix orbis* TAYLOR, 1968a: 336.

Basiceros mandibulare (Weber). **New combination** for *Talaridris mandibularis* WEBER, 1941: 185.

Basiceros petiolatum (Mayr). **New combination** for *Rhopalothrix petiolata* MAYR, 1887: 580 and *Octostruma petiolata* (Mayr), BROWN, 1949c: 92.

Basiceros philippinum (Brown & Kempf). **New combination** for *Eurhopalothrix philippina* BROWN & KEMPF, 1960: 224.

Basiceros piluliferum (Brown & Kempf). **New combination** for *Eurhopalothrix pilulifera* BROWN & KEMPF, 1960: 208.

Basiceros platisquama (Taylor). **New combination** for *Eurhopalothrix platisquama* TAYLOR, 1990: 417.

Basiceros plaumanni (Brown & Kempf). **New combination** for *Rhopalothrix plaumanni* BROWN & KEMPF, 1960: 235.

Basiceros procerum (Emery). **New combination** for *Rhopalothrix procera* EMERY, 1897: 572 and *Eurhopalothrix procera* (Emery), BROWN & KEMPF, 1960: 225.

Basiceros punctatum (Szabó). **New combination** for *Rhopalothrix punctata* SZABÓ, 1910: 366 and *Eurhopalothrix punctata* (Szabó), BROWN & KEMPF, 1960: 221.

Basiceros rothschildi (Taylor). **New combination** for *Eurhopalothrix rothschildi* TAYLOR, 1990: 418.

Basiceros rugiferum (Mayr). **New combination** for *Rhopalothrix rugifer* MAYR, 1887: 579 and *Octostruma rugifera* (Mayr), BROWN, 1949c: 92.

Basiceros rugiferoide (Brown & Kempf). **New combination** for *Octostruma rugiferoides* BROWN & KEMPF, 1960: 200.

Basiceros seguense (Taylor). **New combination** for *Eurhopalothrix seguensis* TAYLOR, 1990: 421.

Basiceros simoni (Emery). **New combination** for *Rhopalothrix simoni* EMERY, 1890: 67 and *Octostruma simoni* (Emery), BROWN, 1949c: 92. Junior synonym of *Octostruma iheringi* Emery, BROWN & KEMPF, 1960: 187. *Octostruma simoni* (Emery), DIETZ, 2004: 127.

Basiceros speciosum (Brown & Kempf). **New combination** for *Eurhopalothrix speciosa* BROWN & KEMPF, 1960: 203.

Basiceros spectabile (Kempf). **New combination** for *Eurhopalothrix spectabilis* KEMPF, 1962: 27.

Basiceros stannardi (Brown & Kempf). **New combination** for *Rhopalothrix stannardi* BROWN & KEMPF, 1960: 236.

Basiceros stenognathum (Brown & Kempf). **New combination** for *Octostruma stenognatha* BROWN & KEMPF, 1960: 196.

Basiceros stenoscaphum (Palacio). **New combination** for *Octostruma stenoscapha* PALACIO, 1997: 414.

Basiceros szentivanyi (Taylor). **New combination** for *Eurhopalothrix szentivanyi* TAYLOR, 1968a: 346.

Basiceros weberi (Brown & Kempf). **New combination** for *Rhopalothrix weberi* BROWN & KEMPF, 1960: 234.

Basiceros wheeleri (Mann). **New combination** for *Rhopalothrix wheeleri* MANN, 1922: 43. *Octostruma wheeleri* (Mann), BROWN, 1949c: 92.

The known species of *Basiceros* have been recently keyed and redescribed by DIETZ (2004) under the name of their new generic synonyms proposed above.

Daceton Perty

Daceton PERTY, 1833: 136. Type species *Formica armigera* Latreille, by monotypy.

Autapomorphies for this monotypic genus included in our data matrix are the following:

Worker (and gyne) *foramen occipitale* dorsal, CI 1.00, RI 0.00.

Worker (and gyne) scape straight at base. CI 0.50, RI 0.33. The straight condition of *Daceton* is shared with *Acanthognathus*.

Worker (and gyne) orifice of the metapleural gland visible. CI 0.33, RI 0.50. The visible condition of *Daceton* appears to be unique among the Dacetini. The low CI and RI values are due to variation among the outgroups.

Worker (and gyne) propodeal spiracle median (instead of posterior). CI 0.33, RI 0.60. The median location of *Daceton* appears to be unique among the Dacetini. The low CI and RI values are due to variation among the outgroups.

Worker (and gyne) antennae 11-jointed. CI 0.20, RI 0.50 for the 11-12 jointed state.

The above apomorphy list is largely sufficient to regard *Daceton* as a separate genus.

The genus contains only one known species, *D. armigerum* (Latreille).

Epopostruma Forel

Strumigenys subg. *Epopostruma* FOREL, 1895: 422. Type species *Strumigenys* (*Epopostruma*) *quadrspinosa* Forel, designated by WHEELER, 1911b: 163.

Epopostruma Forel, EMERY, 1897: 573. Raised to genus.

Hexadaceton BROWN, 1948: 120. Type species *Hexadaceton frosti* Brown, by original designation. Synonymy by BROWN, 1973b.

Colobostruma WHEELER, 1927: 32 (subgenus ad *Epopostruma*). Type species *Epopostruma leae* Wheeler by monotypy. **New synonymy.**

Colobostruma BROWN, 1948: 118. Raised to genus.

Alistruma BROWN, 1948: 117. Type species *Epopostruma foliacea* Emery, by original designation. Synonymy with *Colobostruma* by BROWN, 1959. **New synonymy.**

Clarkistruma BROWN, 1948: 124. Type species *Epopostruma alinodis* Forel, by original designation. Synonymy with *Colobostruma* by BROWN, 1959. **New synonymy.**

Mesostruma BROWN, 1948: 18. Type species *Strumigenys turneri* Forel, by original designation. Synonymy with *Colobostruma* by BARONI URBANI & DE ANDRADE, 1994: 15; revived from synonymy BOLTON, 1999: 1680. **New synonymy.**

Our search was unable to point out at synapomorphies for this genus in its narrow sense, as it was understood in the most recent papers. Neither synapomorphies described in the literature nor emerged in this study as a result of character optimization result from our search. BOLTON (1999: 1681) gives the following two

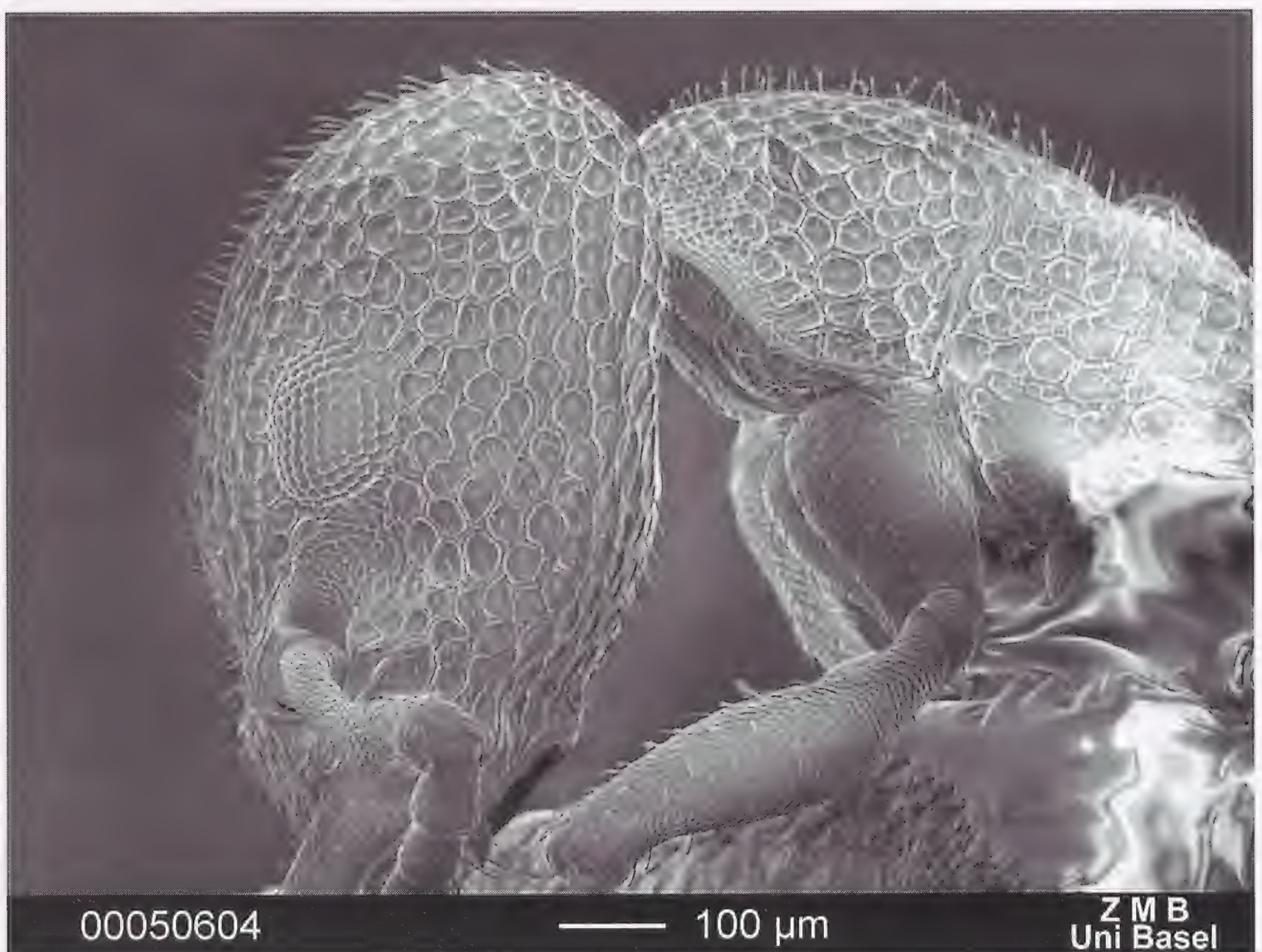


Fig. 37 - *Epopostruma quadrispinosa* (Forel), worker without preocular groove. Presence of the groove is given as synapomorphic for *Epopostruma* in BOLTON (1999).

generic synapomorphies: presence of the labral concavity and of a vertical preocular groove. We previously pointed out that the labral concavity was given by BOLTON (1999:1681) as synapomorphic for *Epopostruma* and by BOLTON (1998:72) for all the Dacetini (see the introduction). Moreover, the labral concavity of some *Epopostruma* is very similar to the one of *Mesostruma* (Fig. 30). On the other hand, the *Epopostruma*'s vertical preocular groove is well visible only in some *Epopostruma* species illustrated by Shattuck's photographs (in BOLTON, 2000) but much less or not at all in others (see also our Fig. 37).

Without clear synapomorphies distinguishing it, *Epopostruma* is destined to remain in the literature as the oldest available generic name of a small clade with *Colobostruma* and *Mesostruma* as junior synonyms as already suggested by BARONI URBANI & DE ANDRADE (1994).

According to BOLTON (1999: 1680) *Mesostruma* (with 8 Australian species) should differ from *Colobostruma* (with 16 Australian species) for only one synapomorphy: "Mandibles elongate triangular, with a larger apical and smaller preapical tooth; proximal of this the margin is edentate and lamellate". Elongate triangular mandibles are present also in *Colobostruma cerornata* Brown (BOLTON, 2000, page 39 [description] and Fig. 38 [figure]) and in *C. froggatti* (Forel) (Fig. 38). The dentition of the mandibles is identical at least in *Colobostruma sisypha* Shattuck (SHATTUCK in BOLTON (2000, Fig. 39)) and *Mesostruma eccentrica* Taylor (SHATTUCK in BOLTON (2000, Fig. 52)). (BOLTON (1999: 1679) lists five synapomorphies for *Colobostruma* as a genus different from *Mesostruma*. These, of course, loose their meaning after demonstrating the paraphyly of the second versus the first. Both generic names together (i.e. *Colobostruma* and *Mesostruma*) are characterized by an excellent synapomorphy (hypertrophied labium) but are in their turn paraphyletic to the oldest available name for the whole clade: *Epopostruma* for which there are no known convincing synapomorphies.

The following four synapomorphies resulting from our data for the broader *Epopostruma* (i.e. including also *Colobostruma* and *Mesostruma*) are all the product of character optimization; three of them are character-states found also in an ancestor and hence representing an evolutionary reversal:

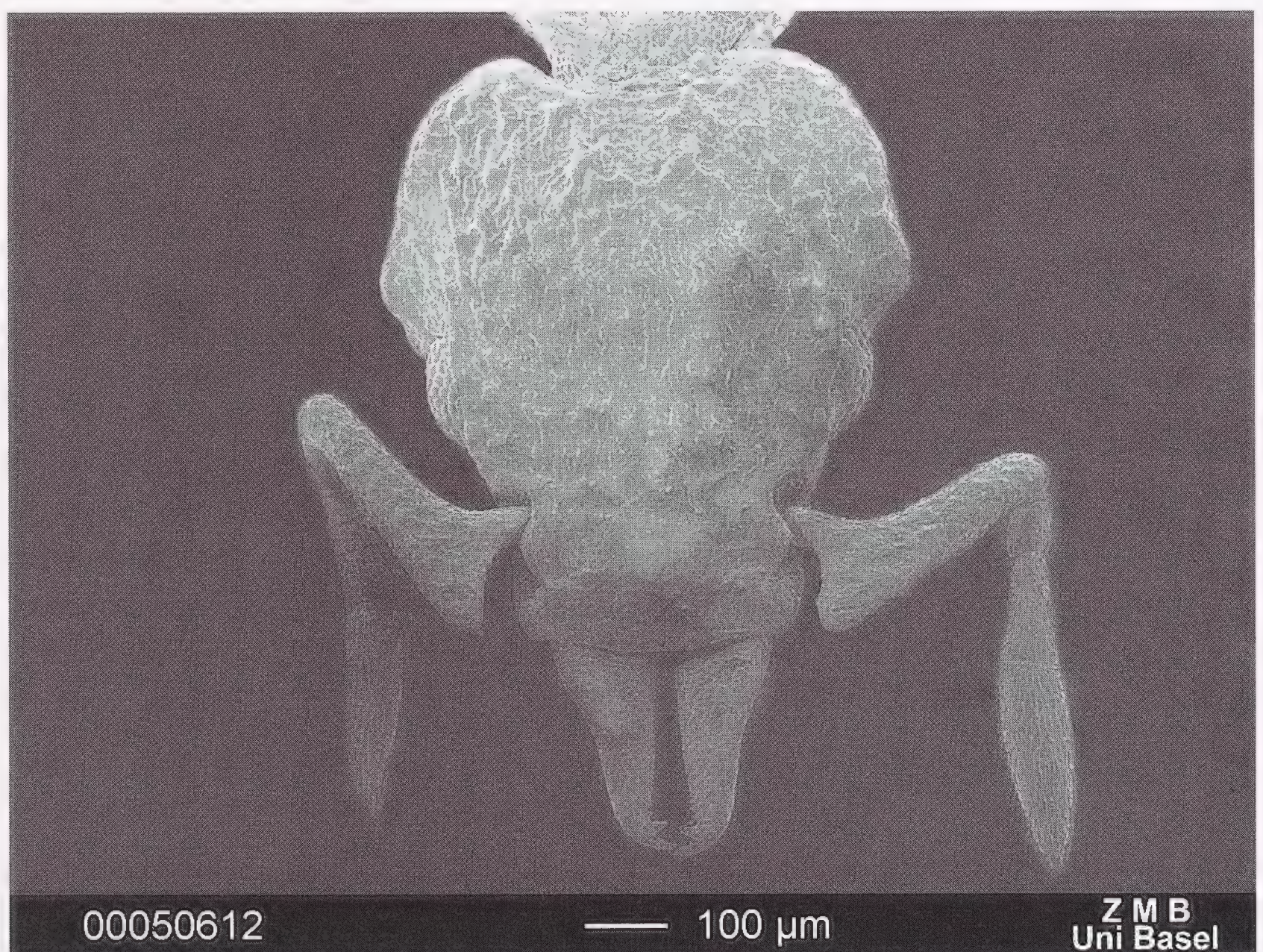


Fig. 38 - *Colobostruma froggatti* (Forel) showing elongate mandibles, a supposed apomorphy for the genus *Mesostruma* according to BOLTON (1999).

Worker (and gyne) antennal scrobe below the eyes. CI 0.71, RI 0.83. This trait, according to our phylogenetic reconstruction, should have been secondarily lost in some *Epopostruma* species actually included in *Colobostruma* and re-appears homoplastically among all basicerotine genera. We consider this pretended secondary loss as plausibly due to head flattening in some species and as a result the most significant synapomorphy for the genus.

Worker (and gyne) labrum capable of full reflexion. CI 0.50, RI 0.87. All remainder dacetine genera have a labium incapable of full reflexion. The low CI and RI values are due to variability among the outgroups. The validity of this character is further weakened by the fact that the capability of full reflexion is widespread among ants and its presumed apomorphic value, in this case, would require a tertiary re-gain of this property.

Worker (and gyne) labrum not T-shaped. CI 0.50, RI 0.33.

This is a widespread dacetine character absent among three immediate *Epopostruma* outgroup genera.

Worker (and gyne) 2-segmented antennal club. CI 0.33, RI 0.71. All remainder dacetine genera have a 2-segmented antennal club. The low CI and RI values are due to variability among the outgroups.

The species previously included in *Epopostruma*, *Colobostruma*, and *Mesostruma* are keyed and described under these three generic names by SHATTUCK (in BOLTON, 2000).

Our synonymies imply the following new or reaffirmed generic transfers:

Epopostruma alinodis FOREL, 1913. *Clarkistruma alinodis* (Forel), BROWN, 1948: 124.

Colobostruma alinodis (Forel) BROWN & WILSON, 1959: 281. **Combination in *Epopostruma* reinstated.**

Epopostruma australis (Brown). **New combination** for *Colobostruma australis* BROWN, 1959: 4.

Epopostruma bella (Shattuck). **New combination** for *Mesostruma bella* SHATTUCK in BOLTON, 2000: 48.

Epopostruma biconcava (Shattuck). **New combination** for *Colobostruma biconcava* SHATTUCK in BOLTON, 2000: 35.

Epopostruma biconvexa (Shattuck). **New combination** for *Colobostruma biconvexa* SHATTUCK in BOLTON, 2000: 35.

Epopostruma bicornis (Shattuck). **New combination** for *Colobostruma bicorna* (sic) SHATTUCK in BOLTON, 2000: 45. Note: the Latin word *cornu* is a neuter noun and cannot be declined in the feminine form. The feminine adjective for two-horned is *bicornis* (Horatius, Vergilius).

Epopostruma browni (Taylor). **New combination** for *Mesostruma browni* TAYLOR, 1962: 1.

Epopostruma cerornata (Brown). **New combination** for *Colobostruma cerornata* BROWN, 1959: 1.

Epopostruma eccentrica (Taylor). **New combination** for *Mesostruma eccentrica* TAYLOR, 1973: 31.

Epopostruma elliotti (Clark). **New combination** for *Epitritus elliotti* CLARK, 1928: 42, and *Clarkistruma elliotti* (Clark), BROWN, 1948: 124, and *Colobostruma elliotti* (Clark), TAYLOR & BROWN, 1985: 60.

Epopostruma foliacea Emery, 1897. *Alistruma foliacea* (Emery), BROWN, 1948: 117. *Colobostruma foliacea* (Emery) BOLTON, 1995: 146. **Combination in *Epopostruma* reinstated.**

Epopostruma froggatti Forel, 1913. *Alistruma froggatti* (Forel), BROWN, 1948: 117. *Colobostruma froggatti* (Forel) TAYLOR & BROWN, 1985: 60. **Combination in *Epopostruma* reinstated.**

Epopostruma inornata (Shattuck). **New combination** for *Mesostruma inornata* SHATTUCK in BOLTON, 2000: 51.

- Epopostruma lacuna* (Shattuck). **New combination** for *Colobostruma lacuna* SHATTUCK in BOLTON, 2000: 36.
- Epopostruma laevigata* (Brown). **New combination** for *Mesostruma laevigata* BROWN, 1952: 12.
- Epopostruma leae* Wheeler. *Colobostruma leae* (Wheeler), BROWN, 1948: 118. **Combination in *Epopostruma* reinstated.**
- Epopostruma loweryi* (Taylor). **New combination** for *Mesostruma loweryi* TAYLOR, 1973: 35.
- Epopostruma mellea* (Shattuck). **New combination** for *Colobostruma mellea* SHATTUCK in BOLTON, 2000: 37.
- Epopostruma nancyae* (Brown). **New combination** for *Colobostruma nancyae* BROWN, 1965b: 22.
- Epopostruma papulata* (Brown). **New combination** for *Colobostruma papulata* BROWN, 1965a: 21.
- Epopostruma sisyphe* (Shattuck). **New combination** for *Colobostruma sisyphe* SHATTUCK in BOLTON, 2000: 37.
- Epopostruma turneri* (Forel). *Strumigenys* (*Epopostruma*) *turneri* FOREL, 1895: 424. *Epopostruma turneri* (Forel), EMERY, 1924: 330. *Mesostruma turneri* (Forel), BROWN, 1948: 119. **Combination in *Epopostruma* reinstated.**
- Epopostruma unicornis* (Shattuck). **New combination** for *Colobostruma unicorna* (sic) SHATTUCK in BOLTON, 2000: 46. Note: the Latin word *cornu* is a neuter noun and cannot be declined in the feminine form. The feminine adjective for single horned is *unicornis* (Plinius, Tertullianus).

Ishakidris Bolton

Ishakidris BOLTON, 1984: 374. Type species *Ishakidris ascitaspis* Bolton, by original designation.

The two genus-level apomorphies resulting for this genus are:

Worker (and gyne?) with visible katepisternal groove (CI 1.00, RI 0.00).

Worker (and gyne?) with first gastral sternum truncated at base (CI 0.67, RI 0.71). This latter character, already considered as synapomorphic for *Basiceros*, is widespread in *Strumigenys* and irregularly present also among other outgroups.

The pretended generic apomorphies above are likely to be a by-product of the clustering together of the three “Phalacromyrmecini” genera, a clustering that we already showed as being based on weak characters (see the discussion under the synonymy of the tribe Phalacromyrmecini). We suspect that all the former Phalacromyrmecini genera might be better understood as atypical *Strumigenys* species.

***Microdaceton* Santschi**

Microdaceton SANTSCHI, 1913b: 478. Type species *Microdaceton exornatum* Santschi, by monotypy.

The following characters result apomorphic for this genus:

Worker (and gyne) pronotal cervix with thick transverse rim. CI 1.00, RI 0.00.

Worker (and gyne) maxillary palps three-jointed. CI 0.85, RI 0.80. Among the Dacetini the three-jointed condition is known only in *Phalacromyrmex* and *Pilotrochus*.

Worker (and gyne) labial palps two-jointed. CI 0.70, RI 0.67. Among the Dacetini the two-jointed condition is known in *Phalacromyrmex*, *Pilotrochus*, *Ishakidris* and some *Basiceros* species.

Other plausible generic synapomorphies not included in our data matrix are listed by BOLTON (1999: 1675).

The four *Microdaceton* species known so far are keyed and described by BOLTON (2000)

***Orectognathus* Smith**

Orectognathus SMITH, 1853: 227. Type species *Orectognathus antennatus* Smith, by monotypy.

Only one, convincing, synapomorphy is known for this genus: the hypertrophy of the second funicular joint of workers and gynes (CI 1.00, RI 0.00).

The known species of this genus have been keyed and described by TAYLOR (1980a).

***Phalacromyrmex* Kempf**

Phalacromyrmex KEMPF, 1960a: 89. Type species *Phalacromyrmex fugax* Kempf, by original designation.

Only one unequivocal synapomorphy for this genus results from our data, the presence of mesopleural costulation. CI 1.00, RI 0.00.

We doubt, however the generic rank of this character. Other apomorphic characters resulting from our analysis are:

Worker (and gyne?) presence of a cuticular process of the mesonotum. CI 0.86, RI 0.75. Cuticular projections of the mesonotum are known also in *Epopostruma* and *Strumigenys*.

Worker (and gyne?) metapleural gland bulla close to the annulus. CI 0.62, RI 0.40. The same character state is encountered in a number of non-related Dacetini genera like *Protalaridris*, *Microdaceton*, *Epopostruma*, a. o.

Worker (and gyne?) antennae 11-jointed. CI 0.20, RI 0.50. A character state shared with several outgroups and with *Daceton* and *Acanthognathus*.

The pretended generic apomorphies above are likely to be a by-product of the clustering together of the three "Phalacromyrmecini" genera, a clustering that we already showed as being based on weak characters (see the discussion under the synonymy of the tribe Phalacromyrmecini). We suspect that all the former Phalacromyrmecini genera might be better understood as atypical *Strumigenys* species.

***Pilotrochus* Brown**

Pilotrochus BROWN, 1978: 218. Type species *Pilotrochus besmerus* Brown, by original designation.

The sole known apomorphy for this genus is the hypertrophic development of the mesosternal hair beds, visible on the profile, CI 1.00, RI 0.00. Mesosternal hair beds are widespread in ants. Whether the hypertrophic development visible in *Pilotrochus* should be considered as a genus-level apomorphy or not may be debated. This doubt, together with the clustering of the three "Phalacromyrmecini" genera that we already showed as being based on doubtful characters (see the discussion under the synonymy of the tribe Phalacromyrmecini) weakens considerably the credibility of *Pilotrochus* as a valid monotypic genus. We suspect that all the former Phalacromyrmecini genera might be better understood as atypical *Strumigenys* species.

***Strumigenys* Smith**

Strumigenys SMITH, 1860: 72. Type species *Strumigenys mandibularis* Smith, by monotypy.

Labidogenys ROGER, 1862: 249. Type species *Labidogenys lyroessa* Roger by monotypy. *Labidogenys* Roger as a synonym of *Strumigenys*, ROGER, 1863b: 40.

Pyramica ROGER, 1862: 251. Type species *Pyramica gundlachi* Roger by monotypy. *Pyramica* Roger as a synonym of *Strumigenys*, ROGER, 1863b: 40. *Pyramica* Roger, revived from synonymy, BOLTON, 1999: 1667. **Synonymy with *Strumigenys* reinstated.**

Cephaloxys SMITH, 1865: 76. Type species *Cephaloxys capitata* Smith by monotypy. Junior homonym of *Cephaloxys* Signoret, 1847 (Hemiptera). Replacement name *Smithistruma* BROWN, 1948: 104.

Epitritus EMERY 1869a: 136. Type species *Epitritus argiolus* Emery by monotypy. *Epitritus* Emery as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Epitritus* Emery revived from synonymy, BOLTON, 1995: 188. *Epitritus* Emery as a synonym of *Pyramica*, BOLTON, 1999: 1667. **Synonymy with *Strumigenys* reinstated.**

Trichoscapa EMERY, 1869b: 24 (subgenus ad *Strumigenys*). Type species *Strumigenys membranifera* Emery by monotypy. *Trichoscapa* Emery as a synonym of *Strumigenys*, DALLA TORRE (1893: 145). *Trichoscapa* Emery as a synonym of *Cephaloxys*, WHEELER (1922: 668). *Trichoscapa* Emery as a good genus, BROWN, 1948: 112. *Trichoscapa* as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Trichoscapa* Emery revived from synonymy, BOLTON, 1995: 421. *Trichoscapa* Emery as a synonym of *Pyramica*, BOLTON, 1999: 1667. **Synonymy with *Strumigenys* reinstated.**

Pentastruma FOREL, 1912a: 50. Type species *Pentastruma sauteri* Forel by monotypy. *Pentastruma* Forel as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Pentastruma* Forel revived from synonymy, BOLTON, 1995: 316. *Pentastruma* Forel as a synonym of *Pyramica*, BOLTON, 1999: 1667. **Synonymy with *Strumigenys* reinstated.**

Glamyromyrmex WHEELER, 1915b: 487. Type species *Glamyromyrmex beebei* Wheeler by monotypy. *Glamyromyrmex* Wheeler as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Glamyromyrmex* Wheeler revived from synonymy, BOLTON, 1995: 207. *Glamyromyrmex* Wheeler as a synonym of *Pyramica*, BOLTON, 1999: 1667. **Synonymy with *Strumigenys* reinstated.**

Codiomyrmex WHEELER, 1916: 326. Type species *Codiomyrmex thaxteri* Wheeler by monotypy. *Codiomyrmex* Wheeler as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Codiomyrmex* Wheeler revived from synonymy, BOLTON, 1995: 146. *Codiomyrmex* Wheeler as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Tingimyrme MANN, 1926: 104 (subgenus ad *Strumigenys*). Type species *Strumigenys mirabilis* Mann by monotypy. *Tingimyrme* Mann as a good genus, BROWN, 1948: 111. *Tingimyrme* Mann as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Tingimyrme* Mann revived from synonymy, BOLTON, 1995: 420. *Tingimyrme* Mann as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Codioxenus SANTSCHI, 1931: 278 (subgenus ad *Epitritus*). Type species *Epitritus simulans* Santschi by monotypy. *Codioxenus* Santschi as a good genus, BROWN, 1948: 123. *Codioxenus* Santschi as a synonym of *Strumigenys*, BARONI URBANI &

DE ANDRADE, 1994: 32. *Codioxenus* Santschi revived from synonymy, BOLTON, 1995: 146. *Codioxenus* Santschi as a synonym of *Pyramica*, BOLTON, 1999: 1668.

Synonymy with *Strumigenys* reinstated.

Proscopomyrmex PATRIZI, 1946: 294. Type species *Proscopomyrmex londianensis* Patrizi by monotypy. *Proscopomyrmex* Patrizi as a synonym of *Strumigenys*, BROWN, 1949b: 15.

Eneria DONISTHORPE, 1948: 598. Type species *Eneria excisa* Donisthorpe by original designation. *Eneria* Donisthorpe as a synonym of *Strumigenys*, BROWN, 1949b: 15.

Smithistruma BROWN, 1948: 104. Type species *Cephaloxys capitata* Smith. Nomen novum pro *Cephaloxys* Smith 1865 nec *Cephaloxys* Signoret 1847. *Smithistruma* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Smithistruma* Brown revived from synonymy, BOLTON, 1995: 383. *Smithistruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Weberistruma BROWN, 1948: 106 (subgenus ad *Smithistruma*). Type species *Strumigenys leptothrix* Wheeler by original designation. Raised to genus by BROWN, 1949b. *Weberistruma* Brown as a synonym of *Smithistruma*, BROWN, 1973a: 35. *Weberistruma* as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy.**

Wessonistruma BROWN, 1948: 106 (subgenus ad *Smithistruma*). Type species *Strumigenys pergandei* Emery by original designation. *Wessonistruma* Brown as a synonym of *Smithistruma*, BROWN, 1973a: 35. *Wessonistruma* as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy**

Serrastruma BROWN, 1948: 107 (subgenus ad *Smithistruma*). Type species *Strumigenys simoni* Emery by original designation. *Serrastruma* Brown as a good genus, BROWN, 1949b: 6. *Serrastruma* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Serrastruma* Brown revived from synonymy, BOLTON, 1995: 382. *Serrastruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Neostruma BROWN, 1948: 111. Type species *Strumigenys crassicornis* Mayr by original designation. *Neostruma* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Neostruma* Brown revived from synonymy, BOLTON, 1995: 292. *Neostruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Dorisidris BROWN, 1948: 116. Type species *Strumigenys nitens* Santschi by original designation. *Dorisidris* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Dorisidris* Brown revived from synonymy, BOLTON, 1995: 177. *Dorisidris* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Miccostruma BROWN, 1948: 116. Type species *Epitritus mandibularis* Szabó by original designation. *Miccostruma* Brown as a synonym of *Smithistruma*, BOLTON, 1983: 274. *Miccostruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy.**

Quadristruma BROWN, 1949a: 47. Type species *Epitritus emmae* Emery by original designation. *Quadristruma* Brown as a synonym of *Strumigenys*, BARONI URBANI

& DE ANDRADE, 1994: 32. *Quadristruma* Brown revived from synonymy, BOLTON, 1995: 377. *Quadristruma* Brown synonymy with *Strumigenys* reinstated, BOLTON, 1999: 1672.

Kyidris BROWN, 1949b: 3. Type species *Kyidris mutica* Brown by original designation. *Kyidris* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Kyidris* Brown revived from synonymy, BOLTON, 1995: 219. *Kyidris* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Polyhomoa AZUMA, 1950: 36. Type species *Polyhomoa itoi* Azuma by monotypy. *Polyhomoa* Azuma as a synonym of *Kyidris*, CREIGHTON, 1950: 93. *Polyhomoa* Azuma as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy.**

Chelystruma BROWN, 1950a: 33 (subgenus ad *Glamyromyrmex*). Type species *Glamyromyrmex lilloana* Brown by monotypy. *Chelystruma* Brown as a good genus, KEMPF, 1959: 338. *Chelystruma* as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Chelystruma* Brown revived from synonymy, BOLTON, 1995: 145. *Chelystruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Borgmeierita BROWN, 1953: 23. Type species *Codiomyrmex excisus* Weber by original designation. *Borgmeierita* Brown as a synonym of *Glamyromyrmex*, BROWN, 1973a: 35. *Borgmeierita* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy.**

Platystruma BROWN, 1953: 112 (subgenus ad *Smithistruma*). Type species *Strumigenys depressiceps* Weber by original designation. *Platystruma* Brown as a synonym of *Smithistruma*, BROWN, 1973a: 35. *Platystruma* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. Undoubted synonym of a synonym of *Strumigenys* supported in this paper. **New synonymy.**

Gymnomyrmex BORGMEIER, 1954: 279. Type species *Gymnomyrmex splendens* Borgmeier by original designation. *Gymnomyrmex* Borgmeier as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Gymnomyrmex* Borgmeier revived from synonymy, BOLTON, 1995: 211. *Gymnomyrmex* Borgmeier as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Dysedrognathus TAYLOR, 1968b: 132. Type species *Dysedrognathus extenuatus* Taylor by original designation. *Dysedrognathus* Taylor as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Dysedrognathus* Taylor revived from synonymy, BOLTON, 1995: 183. *Dysedrognathus* Taylor as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Asketogenys BROWN, 1972: 23. Type species *Asketogenys acubecca* Brown, by original designation. *Asketogenys* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Asketogenys* Brown revived from synonymy, BOLTON, 1995: 75. *Asketogenys* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

Cladarogenys BROWN, 1976: 33. Type species *Cladarogenys lasia* Brown, by original designation. *Cladarogenys* Brown as a synonym of *Strumigenys*, BARONI URBANI & DE ANDRADE, 1994: 32. *Cladarogenys* Brown revived from synonymy, BOLTON, 1995: 145. *Cladarogenys* Brown as a synonym of *Pyramica*, BOLTON, 1999: 1668. **Synonymy with *Strumigenys* reinstated.**

In our study this genus results characterized by the following synapomorphies:

Worker (and gyne) reduction of the labial palps from 2 to 1. CI 0.70, RI 0.67. This trait is shared also with *Acanthognathus* and with some *Basiceros* species previously included in *Talaridris*.

Worker (and gyne) presence of a basimandibular process. CI 0.67, RI 0.86. The synapomorphic state of this character (sometimes of doubtful detection, see Fig. 10) is an artefact of character optimization due to the fact that the basimandibular process is absent in *Phalacromyrmex*, *Pilotrochus*, *Ishakidris*, *Basiceros*, and the hypothetical ancestor of *Acanthognathus* (process present in highly transformed form) and the remaining Dacetini genera (process present). Because of its widespread presence in a number of Dacetini genera, presence of the basimandibular process is a poor discriminant trait to identify *Strumigenys*.

Worker (and gyne) mesosternal hair beds visible in profile. CI 0.91, RI 0.67. In spite of its perfect match within *Strumigenys*, this character is irregularly distributed among several dacetine genera including the three monotypic genera *Phalacromyrmex*, *Pilotrochus* and *Ishakidris*. Moreover, we regard the character itself as insecure: mesosternal hair beds are widespread and coding their visibility in profile as phylogenetically significant needs some imagination and abstraction capacity.

Worker (and gyne) eyes ventral. CI 0.67, RI 0.80. This trait is shared with all and only the former Phalacromyrmecini, but was coded as polymorphic in "*Pyramica*" as a result of our transfer to *Strumigenys* of the blind species *inopinata* (see below, the list of new combinations in *Strumigenys*) originally described in "*Rhopalothrix*". The position of the eyes, otherwise, is likely to represent the main synypomorphy of the genus.

Gyne (and male?) secondary loss of the anal vein. CI 0.75, RI 0.50. This trait appears to be constant among *Strumigenys* but it reappears in some *Acanthognathus* and *Basiceros* species.

Strumigenys (including *Pyramica*) results weakly defined from our analysis, unable to focus on one single clear-cut synapomorphy. On the other hand, by appearing as branch in a tetratemy, its sister-group with which it could eventually be merged is also not clearly identified. For these reasons and for nomenclatorial conser-

vationism we prefer to provisionally maintain *Strumigenys* as a valid genus defined by a combination of characters, a procedure seldom accepted in phylogenetic studies.

Finally, no apomorphies separating *Pyramica* from *Strumigenys* appeared as a result of our character optimization and we were unable to include a single one in our data.

The reason for this exclusion is that no one of the characters listed by BOLTON (1999, 2000) to separate the two genera appear to hold even after a superficial scrutiny.

The following four characters should separate the two genera according to BOLTON (1999, 2000):

- 1) "Mandibles in ventral view broad at extreme base, their articulations located at about the midlength of the labio-maxillary complex". In BOLTON (1999) this is given as apomorphic for *Pyramica* as opposed to "Mandibles in ventral view narrow at extreme base, apparently arising from the apex of the labio-maxillary complex" in *Strumigenys*. This character is not used to separate the two genera in the key by BOLTON (2000: 15). We are greatly embarrassed in tracing a boundary between the two categories defined by BOLTON (l. c.) and find it difficult understanding the character definition even on the basis of some of Bolton's examples (see e. g. BOLTON 1999: Figs. 59 & 81). Our Figs. 39 - 41 exemplify cases of comparable mandibular morphology for both *Pyramica* and *Strumigenys*.
- 2) "Mandibles at full gap open to only 60-90°" in *Pyramica*, vs. "Mandibles at full gape open to 170° or more" in *Strumigenys*. Documenting this character may be difficult for the risks to tear the adductor muscles, an action that would result in too great opening angles and for the tendency to contract the muscle bundles yielding smaller opening angles in drying specimens. Fig. 42 records two examples drawn from a wider array of species contradicting BOLTON's (1999 & 2000) use of this character and observed on relaxed material. Another case was already documented in a web publication by de ANDRADE & BARONI URBANI (2005)
- 3) "Labral lobes hypertrophied" (synapomorphic) versus "arising from across entire width of labium" (plesiomorphic) in *Pyramica*; or "labrum with distal lobes reduced... or vestigial" (ple-

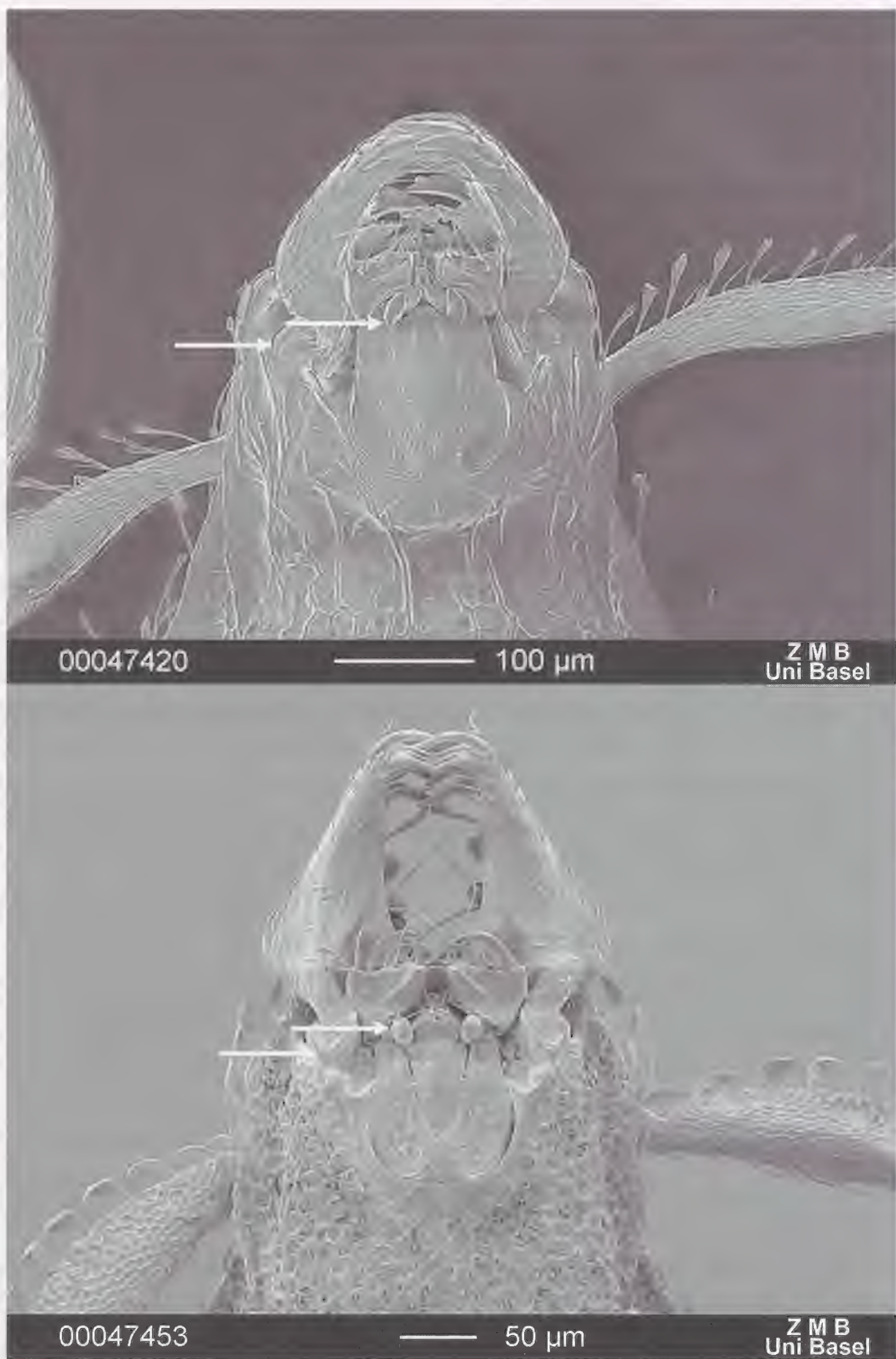


Fig. 39 - Comparable width and position of the base of the mandibles in *Pyramica semicompta* (Brown) (top) and *Strumigenys lyroessa* (Roger) (bottom). The arrows show the position of the mandibular articulations and of the labial palpi as indicator of the distal border of the labio-maxillary complex.

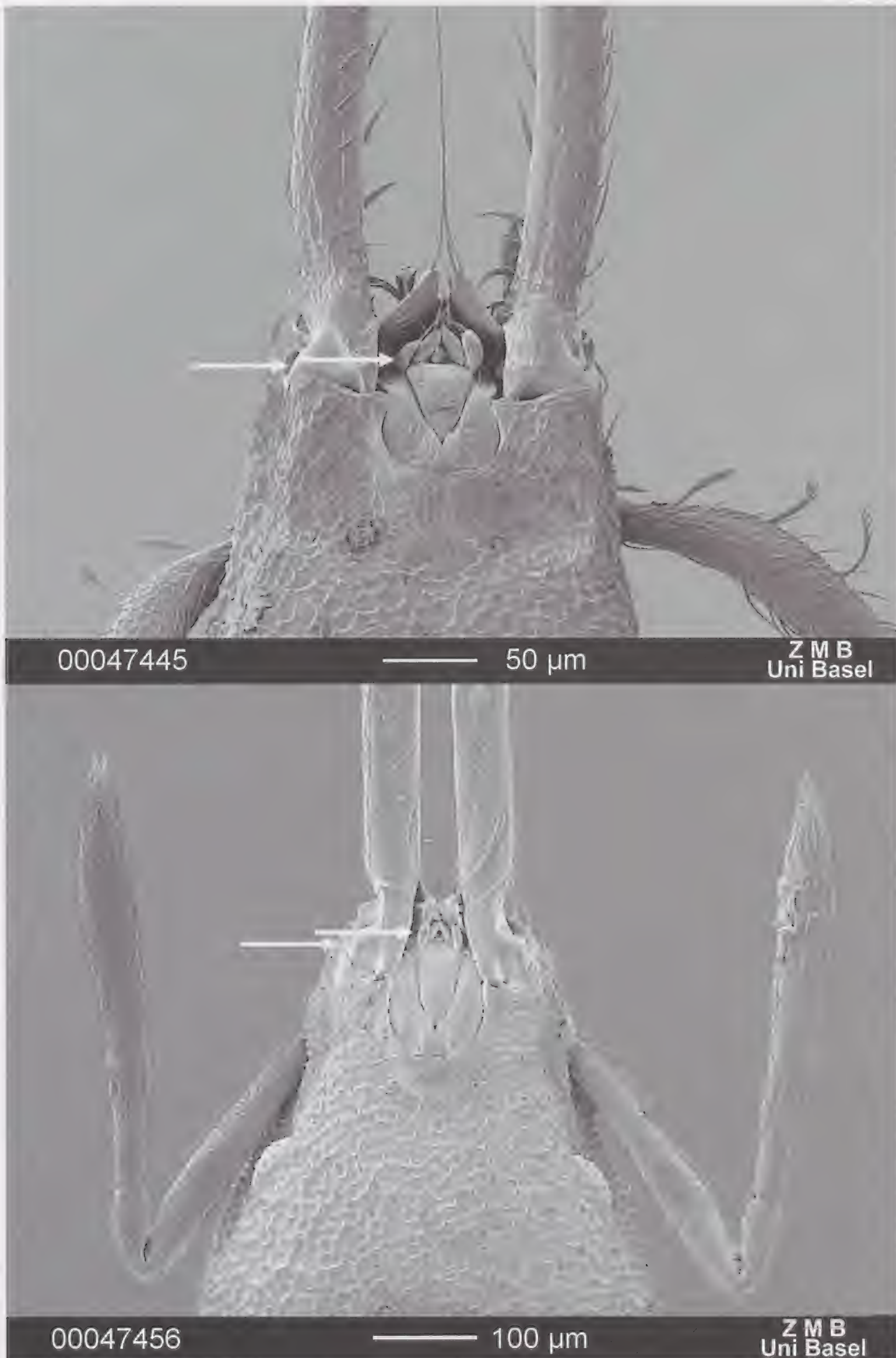


Fig. 40 - Comparable width and position of the base of the mandibles in *Pyramica denticulata* (Mayr) (top) and *Strumigenys lamuginosa* Wheeler (bottom). The arrows show the position of the mandibular articulations and of the labial palpi as indicator of the distal border of the labio-maxillary complex.

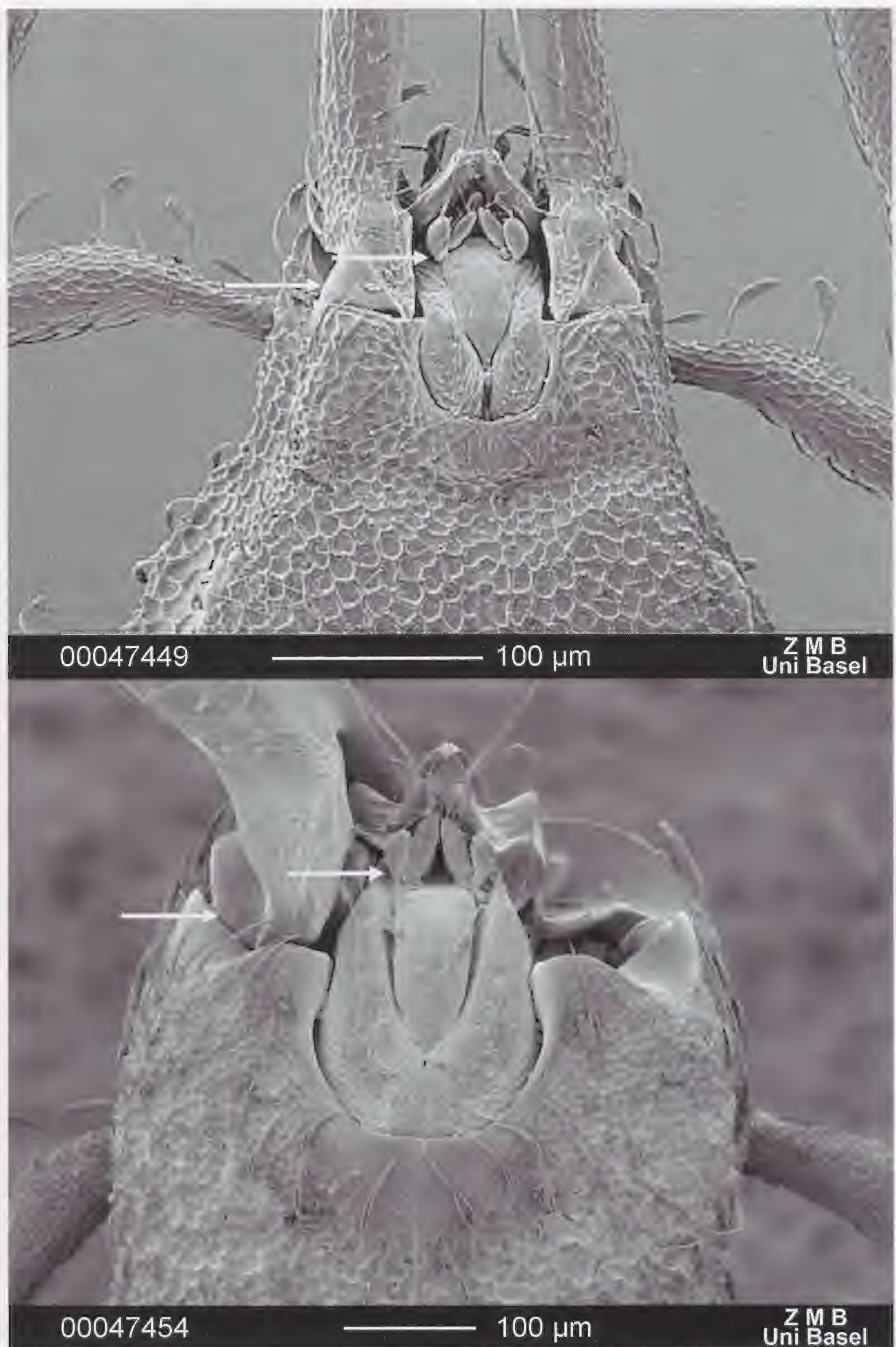


Fig. 41 - Comparable position of the base of the mandibles in *Pyramica eggersi* (Emery) (top) and *Strumigenys godmani* Forel (bottom). The arrows show the position of the mandibular articulations and of the labial palpi as indicator of the distal border of the labio-maxillary complex.

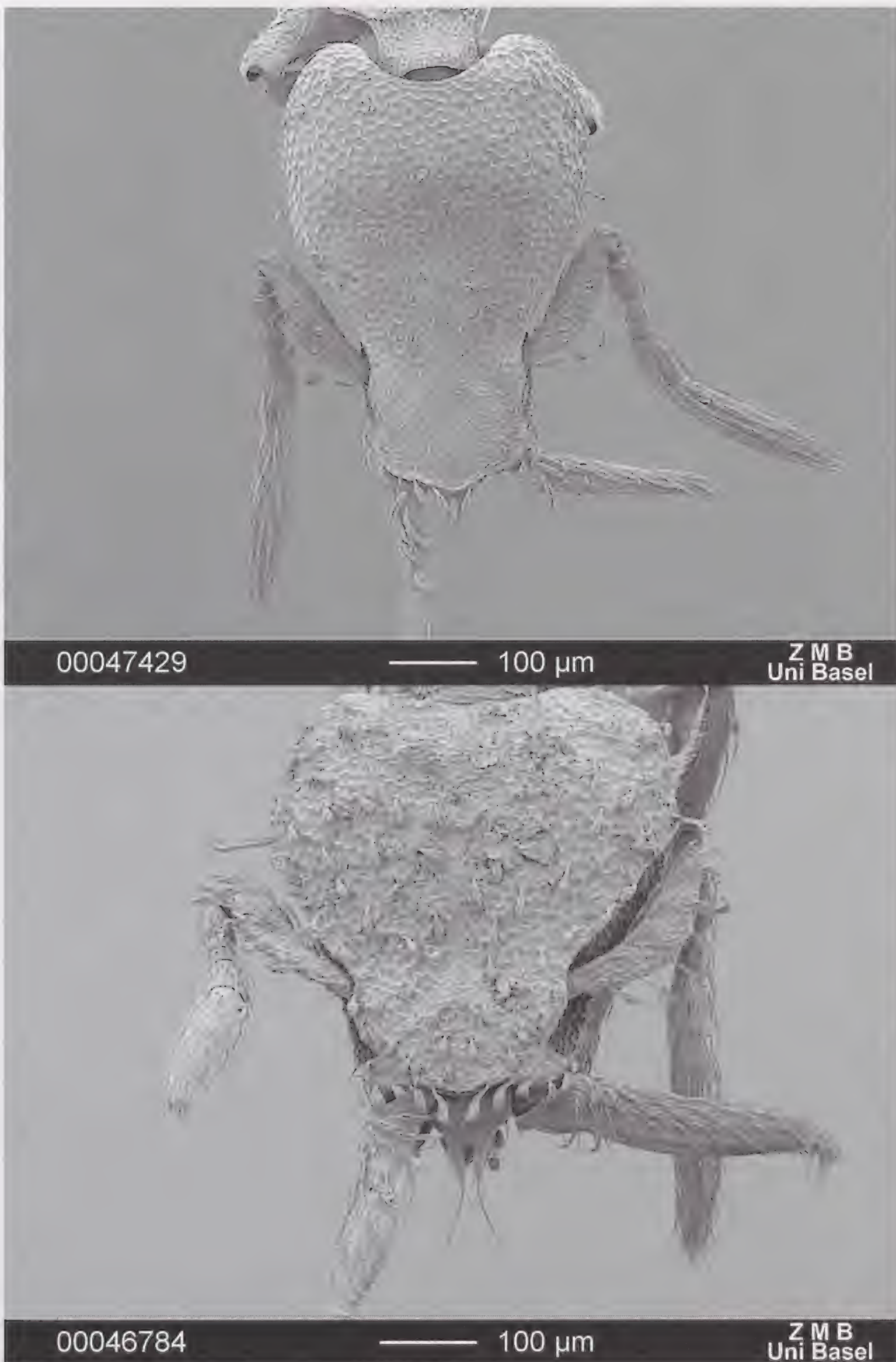


Fig. 42 - *Pyramica zeteki* (Brown) (top) and *Pyramica subedentata* (Mayr) (bottom) opening the left mandible at 90° (= 180° for both mandibles). *Pyramica* species were supposed to never open their mandibles wider than 90°.

siomorphic) “not arising from across entire width of labium” (synapomorphic) in *Strumigenys*. Figures 43 - 44 should be sufficient to exemplify the indefensibility of this partition. Another case contradicting Bolton’s classification was already published in a web document by DE ANDRADE & BARONI URBANI (2005).

- 4) [?Opening of the] “buccal cavity relatively short and wide, lateral margins of cavity... not converging anteriorly” (plesiomorphic) in *Pyramica*, as opposed to “relatively long and narrow, lateral margins of cavity... converging anteriorly”, synapomorphic for *Strumigenys*. Figures 45 - 46 show four cases of contradictory distribution of this character among two *Strumigenys* and two “*Pyramica*” species.

In addition and as a general consideration, any attempt to regard *Strumigenys* and *Pyramica* as valid genera separated by the mandibular kinetic or by any of its morphological correlates would inevitably render one of the two fictitious genera invalid for being paraphyletic to the other as it was already shown under chapter 4.1.

The erroneous separation of *Pyramica* from *Strumigenys* yields to the following, unfortunately necessary list of reaffirmed or new combinations and replacement names for new homonyms in *Strumigenys*. Only the most important references are reported in our list. Additional ones can be found in BOLTON (2000). Needless to say, the tormented nomenclatorial fate of the species listed below (some of them were attributed to three different genera in less than 20 years) can be regarded as an additional proof of the opportunity of merging all *Strumigenys* satellite genera in one. The following is a list of species affected by nomenclatorial changes as compared with the nomenclature adopted by BOLTON (2000) and not a *Strumigenys* species list. The species list can be easily extracted from the monograph of BOLTON (2000).

Strumigenys abdita WESSON & WESSON, 1939: 106. *Smithistruma abdita* (Wesson & Wesson), SMITH, 1951: 827. *Pyramica abdita*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**

Strumigenys abditivata (Bolton). **New combination** for *Pyramica abditivata* BOLTON, 2000: 231.

Strumigenys acheron (Bolton). **New combination** for *Pyramica acheron* BOLTON, 2000: 416.

Strumigenys acubecca (Brown). **New combination** for *Asketogenys acubecca* BROWN, 1972: 23 and *Pyramica acubecca*, BOLTON, 1999: 1672.

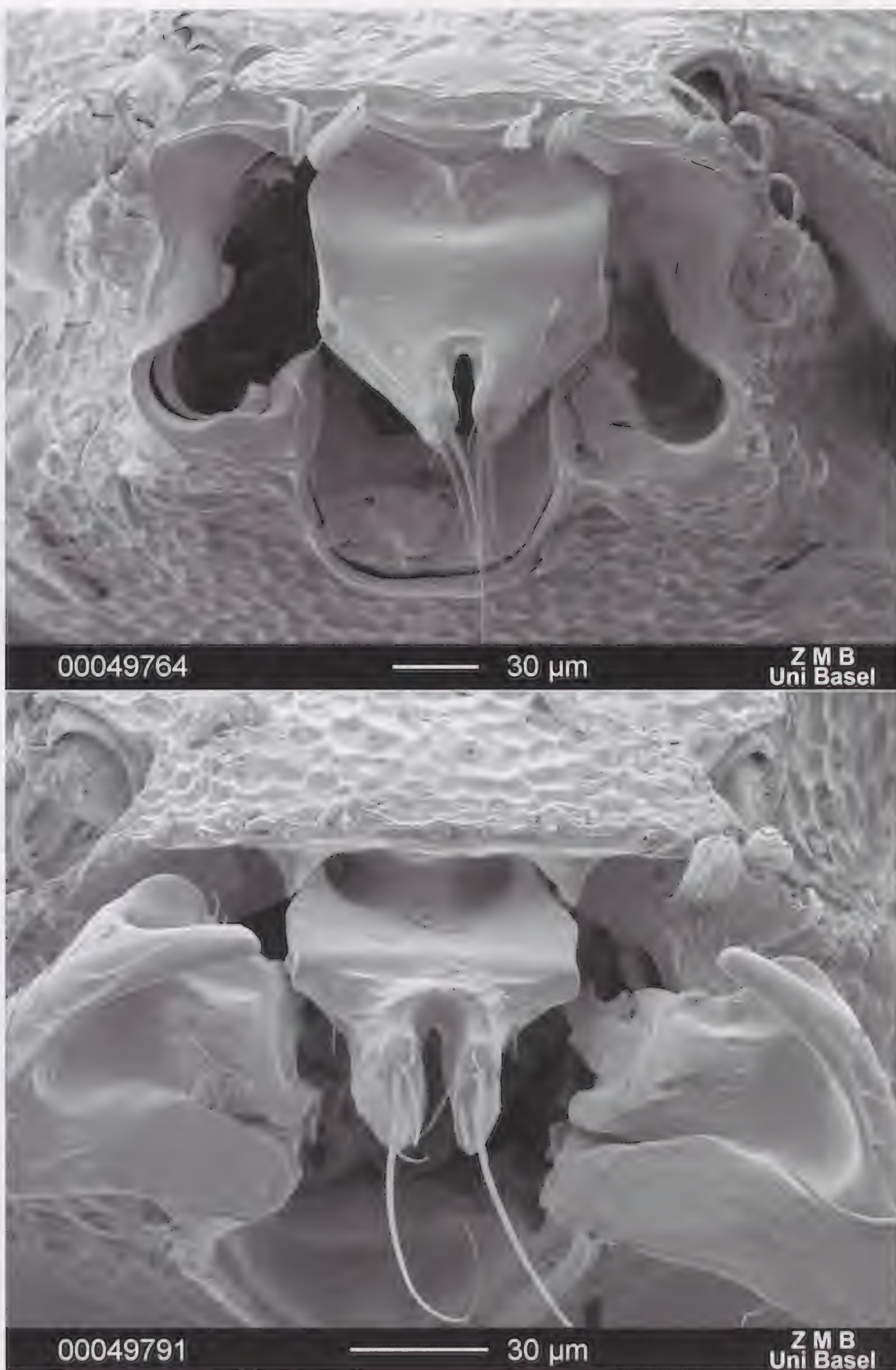


Fig. 43 - Uniformity of shape of the labium among putative *Pyramica* and *Strumigenys* species. *Pyramica xenognatha* (Kempf) (top) and *Strumigenys exilirhina* Bolton (bottom).

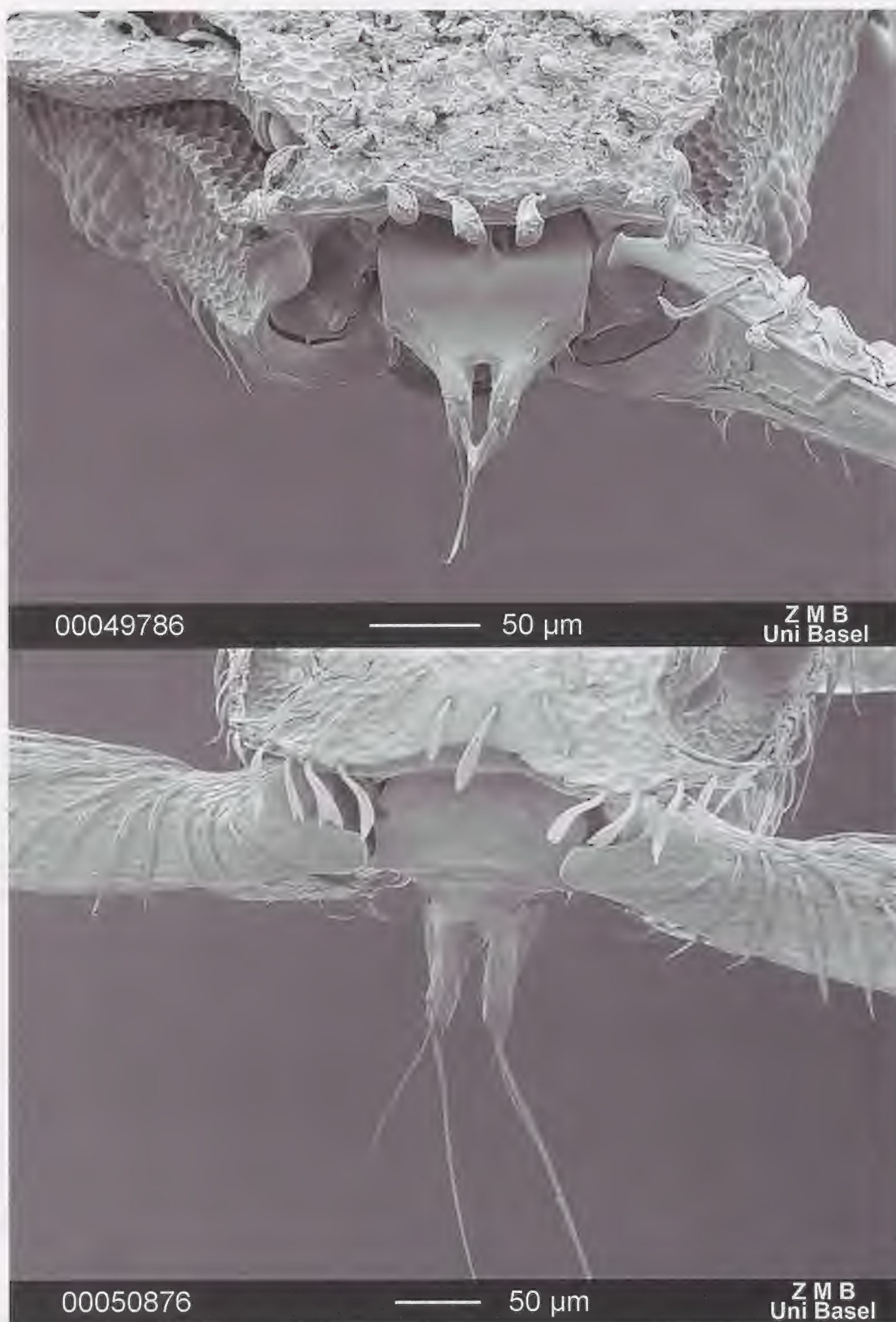


Fig. 44 - Uniformity of shape of the labium among putative *Pyramica* and *Strumigenys* species. *Pyramica subdentata* (Mayr) (top) and *Strumigenys micretes* Brown (bottom).



Fig. 45 - *Pyramica decipula* Bolton (top) with narrow opening and subparallel margins of the buccal cavity and *Strumigenys emmae* (Emery) (bottom) with broad opening and convergent margins of the buccal cavity. The opposite state of this character should characterize the two genera.

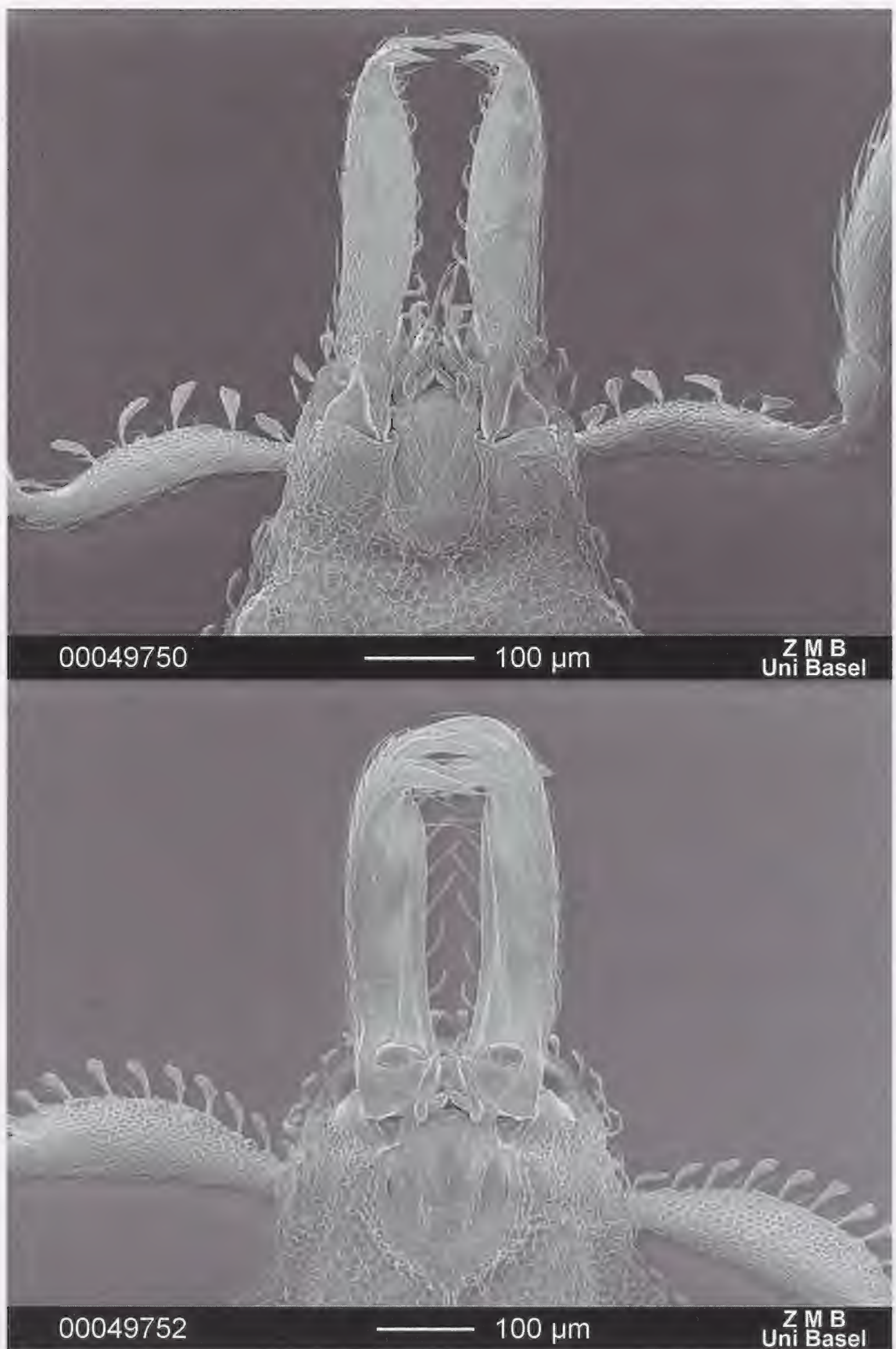


Fig. 46 - *Pyramica subedentata* (Mayr) (top) with narrow opening and subparallel margins of the buccal cavity and *Strumigenys chapmani* Brown (bottom) with broad opening and convergent margins of the buccal cavity. The opposite state of this character should characterize the two genera.

- Strumigenys aello* (Bolton). **New combination** for *Pyramica aello* BOLTON, 2000: 416.
- Strumigenys aethegenys* (Bolton). **New combination** for *Pyramica aethegenys* BOLTON, 2000: 179.
- Strumigenys africana* (Bolton). **New combination** for *Glamyromyrmex africanus* BOLTON, 1983: 322 and *Pyramica africana*, BOLTON, 1999: 1672.
- Strumigenys agnosta* (Bolton). **New combination** for *Pyramica agnosta* BOLTON, 2000: 293.
- Strumigenys agostii* (Bolton). **New combination** for *Pyramica agostii* BOLTON, 2000: 412.
- Strumigenys ailaoshana* (Xu & Zhou). **New combination** for *Pyramica ailaoshana* XU & ZHOU, 2004: 440.
- Strumigenys alberti* FOREL, 1893b: 380. *Smithistruma alberti* (Forel) BROWN 1953: 93. *Pyramica alberti*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys alecto* (Bolton). **New combination** for *Pyramica alecto* BOLTON, 2000: 429.
- Strumigenys ambatrix* (Bolton). **New combination** for *Pyramica ambatrix* BOLTON, 2000: 355.
- Strumigenys anarta* (Bolton). **New combination** for *Smithistruma anarta* BOLTON, 1983: 314 and *Pyramica anarta*, BOLTON, 1999: 1673.
- Strumigenys anderseni* (Bolton). **New combination** for *Pyramica anderseni* BOLTON, 2000: 474.
- Strumigenys angulata* SMITH, 1931: 697. *Smithistruma angulata* (Smith) BROWN, 1953: 54. *Pyramica angulata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys anorbicula* (Bolton). **New combination** for *Pyramica anorbicula* BOLTON, 2000: 287.
- Strumigenys appalachicolensis* (Deyrup & Lubertazzi). **New combination** for *Pyramica appalachicolensis* DEYRUP & LUBERTAZZI, 2001: 15.
- Strumigenys appretiata* (Borgmeier). **New combination** for *Glamyromyrmex appretiatus* BORGMEIER, 1954: 282 and *Pyramica appretiata*, BOLTON, 1999: 1672.
- Strumigenys arahana* (Bolton). **New combination** for *Smithistruma arahana* BOLTON, 1983: 300 and *Pyramica arahana*, BOLTON, 1999: 1673.
- Strumigenys archboldi* (Deyrup & Cover). **New combination** for *Smithistruma archboldi* DEYRUP & COVER, 1998: 217 and *Pyramica archboldi*, BOLTON, 1999: 1673.
- Strumigenys arges* (Bolton). **New combination** for *Pyramica arges* BOLTON, 2000: 462.
- Strumigenys argiola* (Emery). *Epitritus argiolus* EMERY, 1869a: 136. *Strumigenys argiola* (Emery), BARONI URBANI, 1998: 163. *Pyramica argiola*, BOLTON, 1999: 1672. **Combination in *Strumigenys* reinstated.**
- Strumigenys arizonica* (Ward). **New combination** for *Smithistruma arizonica* WARD, 1988: 121 and *Pyramica arizonica*, BOLTON, 1999: 1673.
- Strumigenys asaphes* (Bolton). **New combination** for *Pyramica asaphes* BOLTON, 2000: 171.
- Strumigenys assamensis* de Andrade in BARONI URBANI & DE ANDRADE, 1994: 61. *Smithistruma assamensis* (de Andrade), BOLTON, 1995: 384. *Pyramica assamensis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys atopogenys* (Bolton). **New combination** for *Pyramica atopogenys* BOLTON, 2000: 417.

- Strumigenys atropos* (Bolton). **New combination** for *Pyramica atropos* BOLTON, 2000: 457.
- Strumigenys auctidens* (Bolton). **New combination** for *Pyramica auctidens* BOLTON, 2000: 179.
- Strumigenys augustandrewi* (Longino). **New combination** for *Pyramica augustandrewi* LONGINO, 2006: 140.
- Strumigenys azteca* (Kempf). **New combination** for *Glamyromyrmex aztecus* KEMPF, 1960b: 444 and *Pyramica azteca*, BOLTON, 1999: 1672.
- Strumigenys baudueri* (Emery). *Epitritus baudueri* EMERY, 1875: 474. *Strumigenys baudueri* (Emery), MAYR, 1887: 571 et auctorum omnium recentiorum usque ad 1948. *Smithistruma baudueri* (Emery), BROWN, 1948: 105. *Pyramica baudueri*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys beebei* (Wheeler). **New combination** for *Glamyromyrmex beebei* WHEELER, 1915b: 488 and *Pyramica beebei*, BOLTON, 1999: 1672.
- Strumigenys behasya* (Bolton). **New combination** for *Smithistruma behasya* BOLTON, 1983: 286 and *Pyramica behasya*, BOLTON, 1999: 1673.
- Strumigenys belial* (Bolton). **New combination** for *Pyramica belial* BOLTON, 2000: 331.
- Strumigenys bellatrix* (Bolton). **New combination** for *Pyramica bellatrix* BOLTON, 2000: 336.
- Strumigenys benten* (Terayama, Lin & Wu). **New combination** for *Smithistruma benten* TERAYAMA, LIN & WU, 1996: 329.
- Strumigenys bequaerti* SANTSCHI, 1923: 286. *Serrastruma bequaerti* (Santschi) CONSANI, 1951: 171. *Pyramica bequaerti*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys bimarginata* WESSON & WESSON, 1939: 95. *Smithistruma bimarginata* (Wesson & Wesson) SMITH, 1951: 827. *Pyramica bimarginata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys boltoni* (Deyrup). **New combination** for *Pyramica boltoni* DEYRUP, 2006: 1.
- Strumigenys brevicornis* MANN, 1922: 38. *Neostruma brevicornis* (Mann), BROWN, 1948: 111. *Pyramica brevicornis*, BOLTON, 1999: 1672. **Combination in *Strumigenys* reinstated.**
- Strumigenys brontes* (Bolton). **New combination** for *Pyramica brontes* BOLTON, 2000: 463.
- Strumigenys browni* (Bolton). **New combination** for *Pyramica browni* BOLTON, 2000: 168.
- Strumigenys bubisnoda* (Bolton). **New combination** for *Pyramica bubisnoda* BOLTON, 2000: 393.
- Strumigenys bunki* (Brown). **New combination** for *Smithistruma bunki* BROWN, 1950b: 41 and *Pyramica bunki*, BOLTON, 1999: 1673.
- Strumigenys californica* (Brown). **New combination** for *Smithistruma californica* BROWN, 1950b: 40 and *Pyramica californica*, BOLTON, 1999: 1673.
- Strumigenys canina* (Brown & Boisvert). **New combination** for *Pentastroma canina* BROWN & BOISVERT, 1979: 203 and *Pyramica canina*, BOLTON, 1999: 1673.
- Strumigenys capitata* (Smith). *Cephaloxys capitata* SMITH, 1865: 77. *Strumigenys capitata* (Smith), MAYR, 1866: 517. *Smithistruma capitata* (Smith), BROWN, 1948:

105. *Pyramica capitata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys carinognatha* (Bolton). **New combination** for *Pyramica carinognatha* BOLTON, 2000: 418.
- Strumigenys carnassa* (Bolton). **New combination** for *Pyramica carnassa* BOLTON, 2000: 475.
- Strumigenys carolinensis* (Brown). **New combination** for *Smithistruma carolinensis* BROWN, 1964: 185 and *Pyramica carolinensis*, BOLTON, 1999: 1673.
- Strumigenys cascanteae* (Longino). **New combination** for *Pyramica cascanteae* LONGINO, 2006: 138.
- Strumigenys cassicuspis* (Bolton). **New combination** for *Pyramica cassicuspis* BOLTON, 2000: 216.
- Strumigenys castanea* (Brown). **New combination** for *Smithistruma castanea* BROWN, 1953: 107 and *Pyramica castanea*, BOLTON, 1999: 1673.
- Strumigenys cavinasis* (Brown). **New combination** for *Smithistruma cavinasis* BROWN, 1950b: 42 and *Pyramica cavinasis*, BOLTON, 1999: 1673.
- Strumigenys charybdys* (Bolton). **New combination** for *Pyramica charybdys* BOLTON, 2000: 396.
- Strumigenys chiricahua* (Ward). **New combination** for *Smithistruma chiricahua* WARD, 1988: 119 and *Pyramica chiricahua*, BOLTON, 1999: 1673.
- Strumigenys chyatha* (Bolton). **New combination** for *Smithistruma chyatha* BOLTON, 1983: 288 and *Pyramica chyatha* BOLTON, 1999: 1673.
- Strumigenys cincinnata* (Kempff). **New combination** for *Smithistruma cincinnata* KEMPF, 1975: 419 and *Pyramica cincinnata*, BOLTON, 1999: 1673.
- Strumigenys circothrix* (Ogata & Onoyama). **New combination** for *Smithistruma circothrix* OGATA & ONOYAMA, 1998: 280 and *Pyramica circothrix*. BOLTON, 1999: 1673.
- Strumigenys clotho* (Bolton). **New combination** for *Pyramica clotho* BOLTON, 2000: 413.
- Strumigenys cloydi* (Pfitzer). **New combination** for *Smithistruma cloydi* PFITZER, 1951: 198 and *Pyramica cloydi*, BOLTON, 1999: 1673.
- Strumigenys clypeata* ROGER, 1863a: 213 [*clipecta*!]. *Smithistruma clypeata* (Roger) SMITH, 1951: 827. *Pyramica clypeata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys comis* (Kempff). **New combination** for *Gymnomyrmex comis* KEMPF, 1959: 342 and *Pyramica comis*, BOLTON, 1999: 1672.
- Strumigenys concolor* SANTSCHI, 1914b: 375. *Serrastruma concolor* (Santschi), WEBER, 1925: 6. *Pyramica concolor*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys connectens* KEMPF, 1958: 59. *Pyramica connectens*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys conspersa* EMERY, 1906: 169. *Smithistruma conspersa* (Emery), BROWN, 1953: 100. *Pyramica conspersa*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys convexiceps* SANTSCHI, 1931: 277. *Pyramica convexiceps*, BOLTON, 1999: 1672. **Combination in *Strumigenys* reinstated.**
- Strumigenys crassicornis* MAYR, 1887: 569. *Neostruma crassicornis* (Mayr) BROWN, 1948: 111. *Pyramica crassicornis*, BOLTON, 1999: 1672. **Combination in *Strumigenys* reinstated.**

- Strumigenys creightoni* SMITH, 1931: 705. *Smithistruma creightoni* (Smith), SMITH, 1951: 827. *Pyramica creightoni*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys crementa* (Bolton). **New combination** for *Pyramica crementa* BOLTON, 2000: 182.
- Strumigenys cryptura* (Bolton). **New combination** for *Glamyromyrmex crypturus* BOLTON, 1983: 327 and *Pyramica cryptura*, BOLTON, 1999: 1672.
- Strumigenys dagon* (Bolton). **New combination** for *Glamyromyrmex dagon* BOLTON, 1983: 325 and *Pyramica dagon* Bolton, 1999: 1672.
- Strumigenys dapsilis* (Bolton). **New combination** for *Pyramica dapsilis* BOLTON, 2000: 217.
- Strumigenys daspleta* (Bolton). **New combination** for *Pyramica daspleta* BOLTON, 2000: 445.
- Strumigenys datissa* (Bolton). **New combination** for *Smithistruma datissa* BOLTON, 1983: 289 and *Pyramica datissa*, BOLTON, 1999: 1673.
- Strumigenys dayui* (Xu). **New combination** for *Epitritus dayui* XU, 2000: 297.
- Strumigenys decipula* (Bolton). **New combination** for *Pyramica decipula* BOLTON, 2000: 183.
- Strumigenys deinognatha* (Bolton). **New combination** for *Pyramica deinognatha* BOLTON, 2000: 419.
- Strumigenys deinomastax* (Bolton). **New combination** for *Pyramica deinomastax* BOLTON, 2000: 160.
- Strumigenys denticulata* MAYR, 1887: 570. *Pyramica denticulata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys dentinasis* (Kempf). **New combination** for *Gymnomyrmex dentinasis* KEMPF, 1960b: 450 and *Pyramica dentinasis*, BOLTON 1999: 1672.
- Strumigenys dentiscapa* (Bolton). **New combination** for *Pyramica dentiscapa* BOLTON, 2000: 396.
- Strumigenys depilosa* (Bolton). **New combination** for *Pyramica depilosa* BOLTON, 2000: 312.
- Strumigenys depressiceps* WEBER, 1934: 47. *Smithistruma depressiceps* (Weber), BROWN, 1953: 112. *Pyramica depressiceps*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys deyrupei* (Bolton). **New combination** for *Pyramica deyrupei* BOLTON, 2000: 119.
- Strumigenys dictynna* (Bolton). **New combination** for *Pyramica dictynna* BOLTON, 2000: 294.
- Strumigenys dietrichi* SMITH, 1931: 696. *Smithistruma dietrichi* (Smith), SMITH, 1951: 827. *Pyramica dietrichi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys disjuncta* (Bolton). **New combination** for *Pyramica disjuncta* BOLTON, 2000: 414.
- Strumigenys dispalata* (Bolton). **New combination** for *Pyramica dispalata* BOLTON, 2000: 213.
- Strumigenys dohertyi* EMERY, 1897: 576. *Smithistruma dohertyi* (Emery), BROWN, 1948: 105. *Pyramica dohertyi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**

- Strumigenys dontopagis* (Bolton). **New combination** for *Pyramica dontopagis* BOLTON, 2000: 172.
- Strumigenys doryceps* (Bolton). **New combination** for *Pyramica doryceps* BOLTON, 2000: 211.
- Strumigenys dotaja* (Bolton). **New combination** for *Serrastruma dotaja* BOLTON, 1983: 339 and *Pyramica dotaja*, BOLTON, 1999: 1673.
- Strumigenys dyschima* (Bolton). **New combination** for *Pyramica dyschima* BOLTON, 2000: 451.
- Strumigenys eggersi* EMERY, 1890: 69. *Pyramica eggersi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys electrina* de Andrade in BARONI URBANI & DE ANDRADE, 1994: 38. *Smithistruma electrina* (de Andrade), BOLTON, 1995: 384. *Pyramica electrina*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys elegantula* (Terayama & Kubota). **New combination** for *Smithistruma elegantula* TERAYAMA & KUBOTA, 1989: 788 and *Pyramica elegantula*, BOLTON, 1999: 1673.
- Strumigenys emarginata* MAYR, 1901: 26. *Smithistruma emarginata* (Mayr), BROWN, 1948: 105. *Pyramica emarginata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys emeswangi* (Bolton). **New combination** for *Pyramica emeswangi* BOLTON, 2000: 458.
- Strumigenys emiliae* FOREL, 1907: 11. *Smithistruma emiliae* (Forel), BROWN, 1953: 104. *Pyramica emiliae*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys enkara* (Bolton). **New combination** for *Smithistruma enkara* BOLTON, 1983: 301 and *Pyramica enkara*, BOLTON, 1999: 1673.
- Strumigenys enopla* (Bolton). **New combination** for *Pyramica enopla* BOLTON, 2000: 185.
- Strumigenys epinotalis* WEBER, 1934: 46 [*Strumigenys studiosi epinotalis*]. *Smithistruma epinotalis* (Weber), BROWN, 1953: 101. *Pyramica epinotalis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys epipola* (Bolton). **New combination** for *Pyramica epipola* BOLTON, 2000: 399.
- Strumigenys erikae* (Longino). **New combination** for *Pyramica erikae* LONGINO, 2006: 141.
- Strumigenys erynnes* (Bolton). **New combination** for *Pyramica erynnes* BOLTON, 2000: 351.
- Strumigenys euryale* (Bolton). **New combination** for *Pyramica euryale* BOLTON, 2000: 432.
- Strumigenys excisa* (Weber). **New combination** for *Codiomyrmex excisus* WEBER, 1934: 51 and *Pyramica excisa*, BOLTON, 1999: 1672.
- Strumigenys exiguae vitae* Baroni Urbani. **New name** for *Pyramica hoplites* BOLTON, 2000: 347, transferred to *Strumigenys* in the present paper. Nec *Strumigenys hoplites* BROWN, 1973c: 266. Derivatio nominis: from the Latin *exigua* = short + *vita* = life, referred to the short life of the specific name *hoplites* in combination with the generic name *Pyramica*.
- Strumigenys extemena* (Taylor). **New combination** for *Dysedrognathus extemenus* TAYLOR, 1968b: 133 and *Pyramica extemena*, BOLTON, 1999: 1672.

- Strumigenys exunca* (Bolton). **New combination** for *Pyramica exunca* BOLTON, 2000: 302.
- Strumigenys fautrix* (Bolton). **New combination** for *Pyramica fautrix* BOLTON, 2000: 355.
- Strumigenys fenkara* (Bolton). **New combination** for *Smithistruma fenkara* BOLTON, 1983: 302 and *Pyramica fenkara*, BOLTON, 1999: 1673.
- Strumigenys filirrhina* (Brown). **New combination** for *Smithistruma filirrhina* BROWN, 1950b: 37 and *Pyramica filirrhina*, BOLTON, 1999: 1673.
- Strumigenys filitalpa* (Brown). **New combination** for *Smithistruma filitalpa* BROWN, 1950b: 39 and *Pyramica filitalpa*, BOLTON, 1999: 1673.
- Strumigenys fisheri* (Bolton). *Pyramica fisheri* BOLTON, 2000: 330. **New combination.**
- Strumigenys flagellata* (Taylor). **New combination** for *Codiomyrmex flagellatus* TAYLOR, 1962: 7 and *Pyramica flagellata*, BOLTON, 1999: 1672.
- Strumigenys formosa* (Terayama, Lin & Wu). **New combination** for *Epitritus formosus* TERAYAMA, LIN & WU, 1995: 85 and *Pyramica formosa*, BOLTON, 1999: 1672.
- Strumigenys formosimonticola* (Terayama, Lin & Wu). **New combination** for *Smithistruma formosimonticola* TERAYAMA, LIN & WU, 1996: 331 and *Pyramica formosimonticola*, BOLTON, 1999: 1673.
- Strumigenys fridericimuelleri* FOREL, 1886: 213. *Smithistruma fridericimuelleri* (Forel), BROWN, 1953: 98. *Pyramica fridericimuelleri*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys fulda* (Bolton). **New combination** for *Smithistruma fulda* BOLTON, 1983: 282 and *Pyramica fulda*, BOLTON, 1999: 1673.
- Strumigenys furtiva* (Bolton). **New combination** for *Pyramica furtiva* BOLTON, 2000: 156.
- Strumigenys gatuda* (Bolton). **New combination** for *Smithistruma gatuda* BOLTON, 1983: 292 and *Pyramica gatuda*, BOLTON, 1999: 1673.
- Strumigenys gemella* KEMPF, 1975: 416. *Pyramica gemella*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys geoterra* (Bolton). **New combination** for *Serrastruma geoterra* BOLTON, 1983: 341 and *Pyramica geoterra*, BOLTON 1999: 1673.
- Strumigenys glenognatha* (Bolton). **New combination** for *Pyramica glenognatha* BOLTON, 2000: 160.
- Strumigenys grytava* (Bolton). **New combination** for *Pyramica grytava* BOLTON, 2000: 220.
- Strumigenys gundlachi* (Roger). *Pyramica Gundlachi* ROGER, 1862: 253. *Strumigenys Gundlachi* (Roger), ROGER 1863b: 40 et auctorum omnium recentiorum usque ad 1999. *Pyramica gundlachi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys gyges* (Bolton). **New combination** for *Pyramica gyges* BOLTON, 2000: 424.
- Strumigenys hadrodens* (Bolton). **New combination** for *Pyramica hadrodens* BOLTON, 2000: 161.
- Strumigenys halosis* (Bolton). **New combination** for *Pyramica halosis* BOLTON, 2000: 162.

- Strumigenys hathor* (Bolton). **New combination** for *Pyramica hathor* BOLTON, 2000: 346.
- Strumigenys hemisobek* (Bolton). **New combination** for *Pyramica hemisobek* BOLTON, 2000: 452.
- Strumigenys hensekta* (Bolton). **New combination** for *Smithistruma hensekta* BOLTON, 1983: 293 and *Pyramica hensekta*, BOLTON, 1999: 1673.
- Strumigenys hexamera* (Brown). *Epitritus hexamerus* BROWN, 1958: 70. *Strumigenys hexamera* (Brown) BARONI URBANI & DE ANDRADE, 1994: 13. *Pyramica hexamera*, BOLTON 1999: 1672. **Combination in *Strumigenys* reinstated.**
- Strumigenys hirashimai* (Ogata). **New combination** for *Epitritus hirashimai* OGATA, 1990: 197 and *Pyramica hirashimai*, BOLTON, 1999: 1672.
- Strumigenys hiroshimensis* (Ogata & Onoyama)). **New combination** for *Smithistruma hiroshimensis* OGATA & ONOYAMA, 1998: 281 and *Pyramica hiroshimensis*, BOLTON, 1999: 1673.
- Strumigenys hyalina* (Bolton). **New combination** for *Pyramica hyalina* BOLTON, 2000: 128.
- Strumigenys hyphata* (Brown). **New combination** for *Smithistruma hyphata* BROWN, 1953: 110 and *Pyramica hyphata*, BOLTON, 1999: 1673.
- Strumigenys impidora* (Bolton). **New combination** for *Smithistruma impidora* BOLTON, 1983: 294 and *Pyramica impidora*, BOLTON, 1999: 1673.
- Strumigenys incerta* (Brown). **New combination** for *Smithistruma incerta* BROWN, 1949b: 10 and *Pyramica incerta*, BOLTON, 1999: 1673.
- Strumigenys inopina* (Deyrup & Cover). **New combination** for *Smithistruma inopina* DEYRUP & COVER, 1998: 215 and *Pyramica inopina*, BOLTON, 1999: 1673.
- Strumigenys inopinata* (de Andrade). **New combination** for *Rhopalothrix inopinata* de Andrade in BARONI URBANI & DE ANDRADE, 1994: 54. DIETZ (2004) repeatedly suggests the transfer of this species to *Pyramica* without proposing the new combination. His reasons are a set of characteristic (not synapomorphic) *Strumigenys* characters visible in our 1994 figures. The unique, damaged *inopinata* holotype exhibits one presumed, important “basicerotine” synapomorphy according to BOLTON (1998), a deep transverse labial ridge, and some circumstantial ones, like bizarre pilosity on the scape, scape shape, extreme reduction of the eyes, etc. We already showed in the present paper (see our discussion of character # 6) that the transverse labial ridge may be absent in some “basicerotine” species and present in other *Strumigenys* species. After some hesitation we propose the transfer of *inopinata* to *Strumigenys* for possession of one *Strumigenys* + “Phalacromyrmecini” weak synapomorphy: the presence of the mesepisternal hair beds. These beds, otherwise, are visible also in a few “*Octostruma*” species. *S. inopinata*, moreover, possesses spongiform appendages on the peduncle and gaster, another trait that we don’t consider as synapomorphic but only typical of *Strumigenys*. Nonetheless it must be noted that retention of *inopinata* in *Rhopalothrix* (= *Basicros*), as it was originally described, would strengthen *Strumigenys*’ generic boundaries (see our generic definition above).
- Strumigenys inquilina* (Bolton). **New combination** for *Serrastruma inquilina* BOLTON, 1983: 342 and *Pyramica inquilina*, BOLTON, 1999: 1673.
- Strumigenys insula* (Bolton). **New combination** for *Pyramica insula* BOLTON, 2000: 400.
- Strumigenys inusitata* (Lattke). **New combination** for *Trichoscapa inusitata* LATTKE, 1992: 142 and *Smithistruma inusitata* (Lattke), BOLTON, 1995: 384 and *Pyramica inusitata*, BOLTON, 1999: 1673.

- Strumigenys jacobsoni* MENOZZI, 1939: 180. *Smithistruma jacobsoni* (Menozzi), BROWN, 1948: 105. *Pyramica jacobsoni*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys jamaicensis* BROWN, 1959: 6. *Pyramica jamaicensis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys japonica* ITO, 1914: 40. *Smithistruma japonica* (Ito), BROWN, 1948: 105. *Pyramica japonica*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys karawajewi* BROWN, 1948: 44. *Smithistruma karawajewi* (Brown), BROWN, 1948: 105. *Pyramica karawajewi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys kempfi* (Taylor & Brown). **New combination** for *Smithistruma kempfi* TAYLOR & BROWN, 1978: 35 and *Pyramica kempfi*, BOLTON, 1999: 1673.
- Strumigenys kersasma* (Bolton). **New combination** for *Smithistruma kersasma* BOLTON, 1983: 303 and *Pyramica kersasma*, BOLTON, 1999: 1673.
- Strumigenys khakaura* (Bolton). **New combination** for *Pyramica khakaura* BOLTON, 2000: 348.
- Strumigenys kichijo* (Terayama, Lin & Wu). **New combination** for *Smithistruma kichijo* TERAYAMA, LIN & WU, 1996: 335 and *Pyramica kichijo*, BOLTON, 1999: 1673.
- Strumigenys kompisomala* (Bolton). **New combination** for *Pyramica kompisomala* BOLTON, 2000: 234.
- Strumigenys kyidriiformis* (Brown). **New combination** for *Smithistruma kyidriiformis* BROWN, 1964: 188 and *Pyramica kyidriiformis*, BOLTON, 1999: 1673.
- Strumigenys lachesis* (Bolton). **New combination** for *Pyramica lachesis* BOLTON, 2000: 389.
- Strumigenys laevinasis* SMITH, 1931: 701. *Smithistruma laevinasis* (Smith), SMITH, 1951: 827. *Pyramica laevinasis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys laevipleura* KEMPF, 1958: 64. *Pyramica laevipleura*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys lalassa* (Bolton). **New combination** for *Pyramica lalassa* BOLTON, 2000: 189.
- Strumigenys lasia* (Brown). **New combination** for *Cladarogenys lasia* BROWN, 1976: 34 and *Pyramica lasia*, BOLTON 1999: 1672.
- Strumigenys laticeps* (Brown). **New combination** for *Epitritus laticeps* BROWN, 1962: 77 and *Pyramica laticeps*, BOLTON, 1999: 1672.
- Strumigenys leptothrix* WHEELER, 1929: 55. *Smithistruma leptothrix* (Wheeler), BROWN, 1948: 107. *Weberistruma leptothrix* (Wheeler), BROWN, 1949: 8. *Pyramica leptothrix*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys lilloana* (Brown). **New combination** for *Glamyromyrmex lilloana* BROWN, 1950a: 34 and *Pyramica lilloana*, BOLTON, 1999: 1672.
- Strumigenys longinoi* (Bolton). **New combination** for *Pyramica longinoi* BOLTON, 2000: 173.
- Strumigenys loveridgei* (Brown). **New combination** for *Codiomyrmex loveridgei* BROWN, 1953: 21 and *Pyramica loveridgei*, BOLTON, 1999: 1672.
- Strumigenys lucifuga* (Bolton). **New combination** for *Pyramica lucifuga* BOLTON, 2000: 314.

- Strumigenys ludovici* FOREL, 1904: 369. *Serrastruma ludovici* (Forel), WEBER 1952: 6. *Pyramica ludovici*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys lujae* Forel in WASMANN, 1902: 294. *Serrastruma lujae* (Forel), WEBER, 1952: 6. *Pyramica lujae*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys lygatrix* (Bolton). **New combination** for *Pyramica lygatrix* BOLTON, 2000: 204.
- Strumigenys malaplax* (Bolton). **New combination** for *Smithistruma malaplax* BOLTON, 1983: 304 and *Pyramica malaplax*, BOLTON, 1999: 1673.
- Strumigenys marchosias* (Bolton). **New combination** for *Pyramica marchosias* BOLTON, 2000: 290.
- Strumigenys margaritae* FOREL, 1893b: 378. *Smithistruma margaritae* (Forel), SMITH, 1951: 827. *Pyramica margaritae*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys marginata* (Santschi). **New combination** for *Epitritus marginatus* SANTSCHI, 1914a: 114 and *Miccostruma marginata* (Santschi), BROWN, 1948: 123 and *Smithistruma marginata* (Santschi), BOLTON, 1983: 312 and *Pyramica marginata*, BOLTON, 1999: 1673.
- Strumigenys masukoi* (Ogata & Onoyama). **New combination** for *Smithistruma masukoi* OGATA & ONOYAMA, 1998: 283 and *Pyramica masukoi*, BOLTON, 1999: 1673.
- Strumigenys maxillaris* Baroni Urbani. **New name** for *Epitritus mandibularis* SZABÓ, 1909: 27, transferred to *Strumigenys* in the present paper. Nec *Strumigenys mandibularis* SMITH, 1860: 72. Derivatio nominis: from the Latin *maxillaris*, practically a synonym of the preoccupied name *mandibularis*. *Miccostruma mandibularis* (Szabó), BROWN, 1948b: 123. *Smithistruma mandibularis* (Szabó), BOLTON, 1983: 283. *Pyramica mandibularis*, BOLTON, 1999: 1673.
- Strumigenys maynei* FOREL, 1916: 427. *Serrastruma maynei* (Forel), BROWN, 1952: 77. *Pyramica maynei*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys mazu* (Terayama, Lin & Wu). **New combination** for *Smithistruma mazu* TERAYAMA, LIN & WU, 1996: 337 and *Pyramica mazu*, BOLTON, 1999: 1673.
- Strumigenys media* (Wilson & Brown). **New combination** for *Kyidris media* WILSON & BROWN, 1956: 445 and *Pyramica media*, BOLTON, 1999: 1672.
- Strumigenys medusa* (Bolton). **New combination** for *Pyramica medusa* BOLTON, 2000: 436.
- Strumigenys megaera* (Bolton). **New combination** for *Pyramica megaera* BOLTON, 2000: 437.
- Strumigenys mekaha* (Bolton). **New combination** for *Smithistruma mekaha* BOLTON, 1983: 305 and *Pyramica mekaha*, BOLTON, 1999: 1673.
- Strumigenys membranifera* EMERY, 1869b: 24. *Trichoscapa membranifera* (Emery), BROWN, 1948: 113. *Pyramica membranifera*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys memorialis* (Deyrup). **New combination** for *Smithistruma memorialis* DEYRUP, 1998: 81 and *Pyramica memorialis*, BOLTON, 1999: 1673.
- Strumigenys metazytes* (Bolton). **New combination** for *Pyramica metazytes* BOLTON, 2000: 121.

- Strumigenys metopia* (Brown). **New combination** for *Neostruma metopia* BROWN, 1959: 11 and *Pyramica metopia*, BOLTON, 1999: 1672.
- Strumigenys metrix* (Bolton). **New combination** for *Pyramica metrix* BOLTON, 2000: 222.
- Strumigenys miccata* (Bolton). **New combination** for *Serrastruma miccata* BOLTON, 1983: 348 and *Pyramica miccata*, BOLTON, 1999: 1673.
- Strumigenys microthrix* (Kempf). **New combination** for *Smithistruma microthrix* KEMPF, 1975: 422 and *Pyramica microthrix*, BOLTON, 1999: 1673.
- Strumigenys minima* (Bolton). **New combination** for *Epitritus minimus* BOLTON, 1972: 205 and *Pyramica minima*, BOLTON, 1999: 1672.
- Strumigenys minkara* (Bolton). **New combination** for *Smithistruma minkara* BOLTON, 1983: 306 and *Pyramica minkara*, BOLTON, 1999: 1673.
- Strumigenys minuscula* (Kempf). **New combination** for *Gymnomyrmex minusculus* KEMPF, 1962: 24 and *Pyramica minuscula*, BOLTON, 1999: 1672.
- Strumigenys mira* (Bolton). **New combination** for *Pyramica mira* BOLTON, 2000: 324.
- Strumigenys mirabilis* MANN, 1926: 105. *Tingimymex mirabilis* (Mann), BROWN, 1948: 111. *Pyramica mirabilis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys missouriensis* SMITH, 1931: 701. *Smithistruma missouriensis* (Smith), SMITH 1951: 828. *Pyramica missouriensis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys mitis* (Brown). **New combination** for *Pyramica mitis* Brown in BOLTON, 2000: 442.
- Strumigenys mnemosyne* (Bolton). **New combination** for *Pyramica mnemosyne* BOLTON, 2000: 446.
- Strumigenys moloch* (Bolton). **New combination** for *Pyramica moloch* BOLTON, 2000: 235.
- Strumigenys morisitai* (Ogata & Onoyama). **New combination** for *Smithistruma morisitai* OGATA & ONOYAMA, 1998: 284 and *Pyramica morisitai*, BOLTON, 1999: 1673.
- Strumigenys mormo* (Bolton). **New combination** for *Pyramica mormo* BOLTON, 2000: 290.
- Strumigenys mumfordi* WHEELER, 1932: 160. *Smithistruma mumfordi* (Wheeler), BROWN, 1953: 124. *Pyramica mumfordi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys murphyi* (Taylor). **New combination** for *Epitritus murphyi* TAYLOR, 1968b: 130 and *Pyramica murphyi*, BOLTON, 1999: 1672.
- Strumigenys mutica* (Brown). **New combination** for *Kyidris mutica* BROWN, 1949: 3 and *Pyramica mutica*, BOLTON, 1999: 1672.
- Strumigenys myllorhapha* (Brown). **New combination** for *Neostruma myllorhapha* BROWN, 1959: 12 and *Pyramica myllorhapha*, BOLTON, 1999: 1672.
- Strumigenys nannosobek* (Bolton). **New combination** for *Pyramica nannosobek* BOLTON, 2000: 453.
- Strumigenys necopina* (Bolton). **New combination** for *Pyramica necopina* BOLTON, 2000: 223.
- Strumigenys nepalensis* de Andrade in BARONI URBANI & DE ANDRADE, 1994: 57. *Smithistruma nepalensis* (de Andrade) BOLTON, 1995: 385. *Pyramica nepalensis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**

- Strumigenys nigrescens* WHEELER, 1911a: 28 [*Strumigenys alberti* var. *nigrescens*]. *Smithistruma nigrescens* (Wheeler), BROWN, 1953: 96. *Pyramica nigrescens*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys ninda* (Bolton). **New combination** for *Smithistruma ninda* BOLTON, 1983: 284 and *Pyramica ninda*, BOLTON, 1999: 1673.
- Strumigenys nimravida* (Bolton). **New combination** for *Pyramica nimravida* BOLTON, 2000: 332.
- Strumigenys nitens* SANTSCHI, 1932: 413. *Codiomyrmex nitens* (Santschi), WEBER, 1934: 52. *Dorisidris nitens* (Santschi), BROWN, 1948: 116. *Pyramica nitens*, BOLTON, 1999: 1672. **Combination in *Strumigenys* reinstated.**
- Strumigenys noara* (Bolton). **New combination** for *Pyramica noara* BOLTON, 2000: 304.
- Strumigenys nongba* (Xu & Zhou). **New combination** for *Pyramica nongba* XU & ZHOU, 2004: 440.
- Strumigenys nubila* LATTKE & GOITÍA, 1997: 387. *Pyramica nubila*, BOLTON: 1999. 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys nykara* (Bolton). **New combination** for *Smithistruma nykara* BOLTON, 1983: 307 and *Pyramica nykara*, BOLTON, 1999: 1673.
- Strumigenys oconitrilloae* (Longino). **New combination** for *Pyramica oconitrilloae* LONGINO, 2006: 139.
- Strumigenys ocypete* (Bolton). **New combination** for *Pyramica ocypete* BOLTON, 2000: 420.
- Strumigenys ogyga* (Bolton). **New combination** for *Pyramica ogyga* BOLTON, 2000: 324.
- Strumigenys ohioensis* KENNEDY & SCHRAMM, 1933: 98. *Smithistruma ohioensis* (Kennedy & Schramm) SMITH, 1951: 828. *Pyramica ohioensis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys olsoni* (Bolton). **New combination** for *Pyramica olsoni* BOLTON, 2000: 353.
- Strumigenys orchibia* (Brown). **New combination** for *Smithistruma orchibia* BROWN, 1953: 105 and *Pyramica orchibia*, BOLTON, 1999: 1673.
- Strumigenys ornata* MAYR, 1887: 571. *Smithistruma ornata* (Mayr), SMITH, 1951: 828. *Pyramica ornata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys oxysma* (Bolton). **New combination** for *Smithistruma oxysma* BOLTON, 1983: 315 and *Pyramica oxysma*, BOLTON, 1999: 1673.
- Strumigenys paniaguae* (Longino). **New combination** for *Pyramica paniaguae* LONGINO, 2006: 137.
- Strumigenys paradoxa* (Bolton). **New combination** for *Pyramica paradoxa* BOLTON, 2000: 210.
- Strumigenys parsauga* (Bolton). **New combination** for *Pyramica parsauga* BOLTON, 2000: 157.
- Strumigenys pasisops* (Bolton). **New combination** for *Pyramica pasisops* BOLTON, 2000: 192.
- Strumigenys pedunculata* (Brown). **New combination** for *Smithistruma pedunculata* BROWN, 1953: 118 and *Pyramica pedunculata*, BOLTON, 1999: 1673.
- Strumigenys peetersi* (Bolton). **New combination** for *Pyramica peetersi* BOLTON, 2000: 474.

- Strumigenys pergandei* EMERY, 1895a: 326. *Smithistruma pergandei* (Emery), BROWN, 1948: 106. *Pyramica pergandei*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys perissognatha* (Bolton). **New combination** for *Pyramica perissognatha* BOLTON, 2000: 238.
- Strumigenys phasma* (Bolton). **New combination** for *Pyramica phasma* BOLTON, 2000: 403.
- Strumigenys pholidota* (Bolton). **New combination** for *Pyramica pholidota* BOLTON, 2000: 225.
- Strumigenys pilinasis* FOREL, 1901: 339. *Smithistruma pilinasis* (Forel), SMITH, 1951: 828. *Pyramica pilinasis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys piliversa* (Bolton). **New combination** for *Pyramica piliversa* BOLTON, 2000: 339.
- Strumigenys placora* (Bolton). **New combination** for *Smithistruma placora* BOLTON, 1983: 308 and *Pyramica placora*, BOLTON, 1999: 1673.
- Strumigenys podarge* (Bolton). **New combination** for *Pyramica podarge* BOLTON, 2000: 421.
- Strumigenys prex* (Bolton). **New combination** for *Pyramica prex* BOLTON, 2000: 174.
- Strumigenys probatrix* (Brown). **New combination** for *Smithistruma probatrix* BROWN, 1964: 186 and *Pyramica probatrix*, BOLTON, 1999: 1673.
- Strumigenys pulchella* EMERY, 1895a: 327. *Smithistruma pulchella* (Emery), SMITH, 1951: 828. *Pyramica pulchella*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys pydrax* (Bolton). **New combination** for *Pyramica pydrax* BOLTON, 2000: 466.
- Strumigenys raptans* (Bolton). **New combination** for *Pyramica raptans* BOLTON, 2000: 162.
- Strumigenys ravidura* (Bolton). **New combination** for *Glamyromyrmex ravidurus* BOLTON, 1983: 331 and *Pyramica ravidura*, BOLTON, 1999: 1672.
- Strumigenys reflexa* WESSON & WESSON, 1939: 102. *Smithistruma reflexa* (Wesson & Wesson), SMITH, 1951: 828. *Pyramica reflexa*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys reliquia* (Ward). **New combination** for *Smithistruma reliquia* WARD, 1988: 117 and *Pyramica reliquia*, BOLTON, 1999: 1673.
- Strumigenys reticeps* (Kempf). **New combination** for *Codiomyrmex reticeps* KEMPF, 1969: 286 and *Pyramica reticeps*, BOLTON, 1999: 1672.
- Strumigenys rhea* (Bolton). **New combination** for *Pyramica rhea* BOLTON, 2000: 403.
- Strumigenys robertsoni* (Bolton). **New combination** for *Pyramica robertsoni* BOLTON, 2000: 305.
- Strumigenys rogata* (Bolton). **New combination** for *Pyramica rogata* BOLTON, 2000: 175.
- Strumigenys rohweri* SMITH, 1935: 214. *Smithistruma rohweri* (Smith), SMITH, 1951: 838. *Pyramica rohweri*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**

- Strumigenys roomi* (Bolton). **New combination** for *Epitritus roomi* BOLTON, 1972: 206 and *Pyramica roomi*, BOLTON, 1999: 1672.
- Strumigenys rostrata* EMERY, 1895a: 329. *Smithistruma rostrata* (Emery), SMITH, 1951: 828. *Pyramica rostrata*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys rostrataeformis* (Brown). **New combination** for *Smithistruma rostrataeformis* BROWN, 1949: 12 and *Pyramica rostrataeformis*, BOLTON, 1999: 1673.
- Strumigenys rudinodis* STÄRCKE, 1941: ii [*Strumigenys inezae* var. *rudinodis*]. *Weberistruma rudinodis* (Stärcke), BROWN, 1953: 26. *Smithistruma rudinodis* (Stärcke), BOLTON, 1995: 385. *Pyramica rudinodis*, BOLTON: 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys rugithorax* (Kempff). **New combination** for *Gymnomyrmex rugithorax* KEMPF, 1959: 339 and *Pyramica rugithorax*, BOLTON, 1999: 1672.
- Strumigenys runa* (Bolton). **New combination** for *Pyramica runa* BOLTON, 2000: 447.
- Strumigenys rusta* (Bolton). **New combination** for *Smithistruma rusta* BOLTON, 1983: 3138 and *Pyramica rusta*, BOLTON, 1999: 1673.
- Strumigenys sahura* (Bolton). **New combination** for *Glamyromyrmex sahurus* BOLTON, 1983: 326 and *Pyramica sahura*, BOLTON, 1999: 1672.
- Strumigenys sardonica* (Bolton). **New combination** for *Pyramica sardonica* BOLTON, 2000: 326.
- Strumigenys sauteri* (Forel). **New combination** for *Pentastroma sauteri* FOREL, 1912a: 51 and *Pyramica sauteri*, BOLTON, 1999: 1673.
- Strumigenys schleeorum* Baroni Urbani in BARONI URBANI & DE ANDRADE, 1994: 35. *Smithistruma schleeorum* (Baroni Urbani), BOLTON, 1995: 385. *Pyramica schleeorum*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys schulzi* EMERY, 1894: 213. *Smithistruma schulzi* (Emery), BROWN, 1953: 108. *Pyramica schulzi*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys scolapax* (Bolton). **New combination** for *Pyramica scolapax* BOLTON, 2000: 439.
- Strumigenys scylla* (Bolton). **New combination** for *Pyramica scylla* BOLTON, 2000: 439.
- Strumigenys semicompta* (Brown). **New combination** for *Codiomyrmex semicomptus* BROWN, 1959: 9 and *Pyramica semicompta*, BOLTON, 1999: 1672.
- Strumigenys serket* (Bolton). **New combination** for *Pyramica serket* BOLTON, 2000: 349.
- Strumigenys serradens* (Bolton). **New combination** for *Pyramica serradens* BOLTON, 2000: 404.
- Strumigenys serraformis* (Bolton). **New combination** for *Pyramica serraformis* BOLTON, 2000: 405.
- Strumigenys serrula* SANTSCHI, 1910: 390 [*Strumigenys lujae* var. *serrula*]. *Serrastruma serrula* (Santschi), WEBER, 1952: 5. *Pyramica serrula*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys seti* (Bolton). **New combination** for *Pyramica seti* BOLTON, 2000: 349.
- Strumigenys sharra* (Bolton). **New combination** for *Smithistruma sharra* BOLTON, 1983: 295 and *Pyramica sharra*, BOLTON, 1999: 1673.

- Strumigenys shattucki* (Bolton). **New combination** for *Pyramica shattucki* BOLTON, 2000: 475.
- Strumigenys siagodens* (Bolton). **New combination** for *Pyramica siagodens* BOLTON, 2000: 163.
- Strumigenys simoni* EMERY, 1895a: 42. *Smithistruma simoni* (Emery), BROWN, 1948: 107. *Serrastruma simoni* (Emery), BROWN: 1952: 82. *Pyramica simoni* (Emery), BOLTON: 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys simulans* (Santschi). **New combination** for *Epitritus simulans* SANTSCHI, 1931: 278 and *Codioxenus simulans* (Santschi), BROWN, 1948: 123 and *Pyramica simulans*, BOLTON, 1999: 1672.
- Strumigenys sinensis* (Wang). **New combination** for *Pyramica sinensis* Wang in BOLTON, 2000: 390.
- Strumigenys sistrura* (Bolton). **New combination** for *Glamyromyrmex sistrurus* BOLTON, 1983: 329 and *Pyramica sistrura*, BOLTON 1999: 1672.
- Strumigenys splendens* (Borgmeier). **New combination** for *Gymnomyrmex splendens* BORGMEIER, 1954: 279 and *Pyramica splendens*, BOLTON, 1999: 1672.
- Strumigenys stauroma* (Bolton). **New combination** for *Pyramica stauroma* BOLTON, 2000: 226.
- Strumigenys stenotes* (Bolton). **New combination** for *Pyramica stenotes* BOLTON, 2000: 192.
- Strumigenys subedentata* MAYR, 1887: 570. *Pyramica subedentata*, BOLTON: 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys sublucida* (Brown). **New combination** for *Smithistruma sublucida* BROWN, 1953: 99 and *Pyramica sublucida*, BOLTON, 1999: 1673.
- Strumigenys subsessa* (Bolton). **New combination** for *Pyramica subsessa* BOLTON, 2000: 306.
- Strumigenys substricta* (Kempff). **New combination** for *Glamyromyrmex substrictus* KEMPF, 1964: 68 and *Pyramica substricta*, BOLTON, 1999: 1672.
- Strumigenys sulumana* (Bolton). **New combination** for *Serrastruma sulumana* BOLTON, 1983: 352 and *Pyramica sulumana*, BOLTON, 1999: 1673.
- Strumigenys stheno* (Bolton). **New combination** for *Pyramica stheno* BOLTON, 2000: 440.
- Strumigenys symmetrix* (Bolton). **New combination** for *Pyramica symmetrix* BOLTON, 2000: 356.
- Strumigenys synkara* (Bolton). **New combination** for *Smithistruma synkara* BOLTON, 1983: 309 and *Pyramica synkara*, BOLTON, 1999: 1673.
- Strumigenys tacta* (Bolton). **New combination** for *Smithistruma tacta* BOLTON, 1983: 317 and *Pyramica tacta*, BOLTON, 1999: 1673.
- Strumigenys takasago* (Terayama, Lin & Wu). **New combination** for *Kyidris takasago* TERAYAMA, LIN & WU, 1995: 87 and *Pyramica takasago*, BOLTON, 1999: 1672.
- Strumigenys talpa* WEBER, 1934: 63. *Smithistruma talpa* (Weber), SMITH 1951: 828. *Pyramica talpa*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys tanymastax* (Brown). **New combination** for *Smithistruma tanymastax* BROWN, 1964: 183 and *Pyramica tanymastax*, BOLTON, 1999: 1673.
- Strumigenys taphra* (Bolton). **New combination** for *Pyramica taphra* BOLTON, 2000: 448.

- Strumigenys tarbosyne* (Bolton). **New combination** for *Pyramica tarbosyne* Bolton, 2000: 422.
- Strumigenys tathula* (Bolton). **New combination** for *Pyramica tathula* BOLTON, 2000: 352.
- Strumigenys tenuipilis* EMERY, 1915: 264 [*Strumigenys baudueri* var. *tenuipilis*]. *Smithistruma tenuipilis* (Emery), BROWN, 1953: 132. *Pyramica tenuipilis*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys tenuissima* (Brown). **New combination** for *Smithistruma tenuissima* BROWN, 1953: 133 and *Pyramica tenuissima*, BOLTON, 1999: 1673.
- Strumigenys teratrix* (Bolton). **New combination** for *Pyramica teratrix* BOLTON, 2000: 163.
- Strumigenys terayamai* (Bolton). **New combination** for *Pyramica terayamai* BOLTON, 2000: 468.
- Strumigenys terroni* (Bolton). **New combination** for *Smithistruma terroni* BOLTON, 1983: 299 and *Pyramica terroni*, BOLTON, 1999: 1673.
- Strumigenys tethepa* (Bolton). **New combination** for *Pyramica tethepa* BOLTON, 2000: 328.
- Strumigenys tethys* (Bolton). **New combination** for *Pyramica tethys* BOLTON, 2000: 406.
- Strumigenys tetragnatha* (Taylor). **New combination** for *Codiomyrmex tetragnathus* TAYLOR, 1966: 225 and *Pyramica tetragnatha*, BOLTON, 1999: 1672.
- Strumigenys thaxteri* (Wheeler). **New combination** for *Codiomyrmex thaxteri* WHEELER, 1916: 327 and *Pyramica thaxteri*, BOLTON, 1999: 1672.
- Strumigenys theia* (Bolton). **New combination** for *Pyramica theia* BOLTON, 2000: 407.
- Strumigenys themis* (Bolton). **New combination** for *Pyramica themis* BOLTON, 2000: 407.
- Strumigenys thuvida* (Bolton). **New combination** for *Glamyromyrmex thuvidus* BOLTON, 1983: 332 and *Pyramica thuvida*, BOLTON, 1999: 1672.
- Strumigenys tiglath* (Bolton). **New combination** for *Epitritus tiglath* BOLTON, 1983: 357 and *Pyramica tiglath*, BOLTON, 1999: 1672.
- Strumigenys tigrilla* (Brown). **New combination** for *Miccostruma tigrilla* BROWN, 1973a: 32 and *Smithistruma tigrilla* (Brown), BOLTON, 1983: 284 and *Pyramica tigrilla*, BOLTON, 1999: 1673.
- Strumigenys tisiphone* (Bolton). **New combination** for *Pyramica tisiphone* BOLTON, 2000: 390.
- Strumigenys tlaloc* (Bolton). **New combination** for *Pyramica tlaloc* BOLTON, 2000: 244.
- Strumigenys tolomyla* (Bolton). **New combination** for *Smithistruma tolomyla* BOLTON, 1983: 310 and *Pyramica tolomyla*, BOLTON, 1999: 1673.
- Strumigenys transversa* SANTSCHI, 1913: 258. *Smithistruma transversa* (Santschi), BROWN, 1948: 105. *Pyramica transversa*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys trauma* (Bolton). **New combination** for *Pyramica trauma* BOLTON, 2000: 408.
- Strumigenys trieces* BROWN, 1960: 50. *Pyramica trieces*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**

- Strumigenys truncatidens* (Brown). **New combination** for *Smithistruma truncatidens* BROWN, 1950b: 43 and *Pyramica truncatidens*, BOLTON, 1999: 1673.
- Strumigenys trymala* (Bolton). **New combination** for *Glamyromyrmex trymalus* BOLTON, 1983: 333 and *Pyramica trymala*, BOLTON, 1999: 1672.
- Strumigenys tukulta* (Bolton). **New combination** for *Glamyromyrmex tukultus* BOLTON, 1983: 334 and *Pyramica tukulta*, BOLTON, 1999: 1672.
- Strumigenys turpis* (Bolton). **New combination** for *Pyramica turpis* BOLTON, 2000: 176.
- Strumigenys umboceps* (Bolton). **New combination** for *Pyramica umboceps* BOLTON, 2000: 227.
- Strumigenys urrhobia* (Bolton). **New combination** for *Pyramica urrhobia* BOLTON, 2000: 228.
- Strumigenys vartana* (Bolton). **New combination** for *Pyramica vartana* BOLTON, 2000: 195.
- Strumigenys vescops* (Bolton). **New combination** for *Pyramica vescops* BOLTON, 2000: 409.
- Strumigenys victrix* (Bolton). **New combination** for *Pyramica victrix* BOLTON, 2000: 356.
- Strumigenys villiersi* (Perrault). **New combination** for *Gymnomyrmex villiersi* PERRAULT, 1986: 1 and *Pyramica villiersi*, BOLTON, 1999: 1672.
- Strumigenys vodensa* (Bolton). **New combination** for *Smithistruma vodensa* BOLTON, 1983: 317 and *Pyramica vodensa*, BOLTON: 1999: 1673.
- Strumigenys warditeras* (Bolton). **New combination** for *Pyramica warditeras* BOLTON, 2000: 246.
- Strumigenys weberi* (Brown). **New combination** for *Smithistruma weberi* BROWN, 1959: 7 and *Pyramica weberi*, BOLTON, 1999: 1673.
- Strumigenys wheeleriana* Baroni Urbani. **New name** for *Glamyromyrmex wheeleri* SMITH, 1944: 266, transferred to *Strumigenys* in the present paper. *Pyramica wheeleri*, BOLTON, 1999: 1672. Nec *Epitritus wheeleri* DONISTHORPE, 1916: 121, junior synonym of *Strumigenys emmae* (Emery). Nec *Strumigenys wheeleri* MANN, 1921: 466, secondary homonym of *Epitritus wheeleri* DONISTHORPE, 1916: 121.
- Strumigenys wilsoniana* Baroni Urbani. **New name** for *Pyramica wilsoni* Wang in BOLTON, 2000: 469. Nec *Strumigenys wilsoni* BROWN, 1969: 28.
- Strumigenys wrayi* (Brown). **New combination** for *Smithistruma wrayi* BROWN, 1950b: 38 and *Pyramica wrayi*, BOLTON, 1999: 1673.
- Strumigenys xenochelyna* (Bolton). **New combination** for *Pyramica xenochelyna* BOLTON, 2000: 165.
- Strumigenys xenognatha* KEMPF, 1958: 64. *Pyramica xenognatha*, BOLTON, 1999: 1673. **Combination in *Strumigenys* reinstated.**
- Strumigenys xenomastax* (Bolton). **New combination** for *Pyramica xenomastax* BOLTON, 2000: 471.
- Strumigenys yaleogyna* (Wilson & Brown). **New combination** for *Kyidris yaleogyna* WILSON & BROWN, 1956: 443 and *Pyramica yaleogyna*, BOLTON, 1999: 1672.
- Strumigenys yangi* (Xu & Zhou). **New combination** for *Pyramica yangi* XU & ZHOU, 2004: 445.
- Strumigenys zeteki* (Brown). **New combination** for *Neostruma zeteki* BROWN, 1959: 10 and *Pyramica zeteki*, BOLTON, 1999: 1672.

5. KEY TO THE EXTANT GENERA OF AGROECOMYRMECINI AND DACETINI

The key to the Dacetini genera by BOLTON (2000), in spite of the facilitation due to the exclusion of *Basiceros* and some small genera, contains a number of invalid statements if one broadens the number of taxa examined. For instance, presence or absence of the limbus as used in the first couplet to separate his “strumigenyte genera” from the other dacetines does not hold if *Phalacromyrmex* and *Basice-ros* are also considered. Several elements of BOLTON’s (2000) key cannot be used in our context. On the other hand, uncertainties are implicitly recognized also by Bolton while qualifying characters as “extremely rare” or “extremely rarely absent”. Several other char-acters were already shown during the present study to hold for a majority of species only.

The following key should be of broader validity due to the more rigorous and operational generic definitions adopted for the present study. Although imprecise, the key still contains also some probabi-listic statements similar to those employed by Bolton since they may facilitate identification in a number of cases.

- 1. Eyes present and posterior to the antennal scrobe. Petio-lar tergum and sternum differently shaped. No specialized large mechanoreceptors on the mouthparts. Neotropical
..... *Tatuidris*
- Eyes generally present and never posterior to the anten-nal scrobe, or, very rarely (*Strumigenys inopinata*) absent. Petiolar tergum and sternum equally convex. Mouthparts nearly always with some large, specialized mechanorecep-tors (exceptions a few *Strumigenys* and *Epopostruma* spe-cies)..... 2
- 2. Pretergite of first gastral segment subsessile to sessile. Base of scape bent at right angle near the base. First gastral seg-ment nearly always sculptured. Neotropical, Indomalayan, Australian..... *Basiceros*
- Pretergite of first gastral segment neck like. Base of scape straight or at least complanar with the basal condyle, rarely bent at right angle. First gastral segment almost never sculptured (exceptions, a few *Strumigenys* species) 3

3. Mandibles with alternating small and large teeth. Scape clavate. Basimandibular process absent. 4
 - Mandibular dentition different, or, if alternating large and small teeth present, the scape is never clavate. Basimandibular process nearly always present 6
4. Katepisternal oblique groove deeply impressed. Vertexal angles pointed backwards, mesosoma dorsally marginate. Malaysia *Ishakidris*
 - None of the characters above. . . 5
5. Mesosternal hair beds hypertrophied. Long and flexuous pilosity on the whole body. Head sculpture deeply reticulate. Antennae eight jointed. Madagascar. *Pilotrochus*
 - Mesopleurae obliquely costulate. Pilosity rare and short. Frontal lobes strongly developed. Antennae eleven jointed. Brazil *Phalacromyrmex*
6. Eyes ventral or, very rarely, absent. Labial palps one jointed. Basal process of the mandibles never hypertrophied. World tropics and temperate areas *Strumigenys*
 - Eyes always present, dorsal or lateral. Labial palps generally two or three jointed, if one jointed, the basal process of the mandibles is hypertrophied 7
7. Basimandibular process hypertrophic and bifurcated at the apex, situated below the labrum with closed mandibles. Maxillary palps absent. Neotropical *Acanthognathus*
 - Basimandibular process normally developed, situated above the labrum with closed mandibles. Maxillary palps present 8
8. Second funicular joint hypertrophic, longer than the last segment. Indomalayan and Australian *Orectognathus*
 - Second funicular joint normally developed, shorter than the last segment 9
9. Antennae eleven jointed. Eyes dorsal. Occipital foramen dorsal. Neotropical. *Daceton*

- Antennae four to eight jointed. Eyes dorsolateral. Occipital foramen posterior. 10
- 10. Large pre-genal cavity visible in profile behind the base of the mandibles. Palp formula 3,2. Labrum not capable of full reflexion over the buccal cavity. Antennal scrobes absent. Ethiopian. *Microdaceton*
- Gap between mandibles and head capsule reduced in profile. Palp formula 5,3. Labrum capable of full reflexion over the buccal cavity. Antennal scrobes below the eyes. Australian. *Epopostruma*

6. SPECIES-LEVEL ADDITIONS

Basiceros floridanum (Brown and Kempf)

Cuba: Sancti Spiritus Province: way between Topes de Colantes and Trinidad, 19.XII.2000, 1 worker, M. L. de Andrade & C. Baroni Urbani, Winkler extraction from litter (MSNG). Ciego de Avila Province: way between Ciego de Avila and Majagua, 17.XII.2000, 1 worker, C. Baroni Urbani & M. L. de Andrade, Winkler extraction from litter (MSNG).

This species was previously known only from Florida, from where there is an extensive list of locality records, and from Mexico (DEYRUP *et al.*, 1997). BROWN & KEMPF (1960) suggest that the species may have been introduced to Florida from Latin America. DEYRUP *et al.* (1997) substantially agree with this supposition but note that the lack of West Indian records should be considered as a counter-argument for the hypothesis. The two Cuban records above fill this gap.

Basiceros onorei Baroni Urbani & de Andrade n. sp.

Type material: holotype worker (unique) from Ecuador labelled: Baños de Agua Santa, Prov. Tungurahua, 01°24'S 78°25'W, 1860 m, sendero Bella Vista, leaf-litter, 26.VIII.2004, C. Baroni Urbani & M. L. de Andrade (PUCE).

Derivatio nominis. This species is named after Prof Dr Giovanni Onore who facilitated in multiple ways our Dacetini field work in Ecuador.

D i a g n o s i s . A *Basiceros* species belonging to the *petiolatum*-group as defined by BROWN & KEMPF (1960) (in *Octostruma*) and differing from all species of this group, *inca*, *jheringi*, *stenoscapum*, *petiolatum* and *wheeleri* (BROWN & KEMPF, 1960; PALACIO, 1997), by the following combination of characters: occipital margin with a row of four clavate hairs, each upper scrobe margin with one clavate hair, pronotum and mesonotum with a pair of clavate hairs each, gaster with 4 rows of erect, clavate hairs (2,2,2,4), sides of the basal face of the propodeum strongly marginate, and propodeum, pleurae and gaster largely smooth, sub-opaque to shining.

Worker description (Fig. 47). Head dorsum weakly convex in full dorsal view. Postero-lateral sides of the head with the two anterior thirds diverging posteriorly into a round angle and the posterior third gently converging into a weakly concave vertexal margin. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending below the eye. Eyes small, with 4 ommatidia in the longest row, placed on the upper margin of the antennal scrobes. With head in profile the scrobe very distinct, with the upper margin behind the eye broad, lamellaceous, semitransparent and the lower one strongly carinate. Anterior clypeal border medially with a broad concavity. Scapes slightly compressed dorsoventrally, with strong subbasal bend. Antennae with eight joints. Apical funicular joint slightly longer than the rest of the funiculus. Mandibles triangular, with a series of 5 teeth and two irregular denticles before the subround apex.

Mesosoma anteriorly convex and posteriorly sloping in profile. Dorsum of the mesosoma medially with a broad, superficial, longitudinal sulcus spacing from the pronotum to the mesonotum. Propodeal suture superficially impressed. Posterior half of the basal face of the propodeum gently concave. Sides of the basal face of the propodeum strongly marginate. Propodeal teeth large, lamellaceous, transparent, apically pointed and with broad base. Upper bases of propodeal teeth strongly marginate, connected each other and forming a clear carina dividing the basal and declivous faces. Lower base of propodeal teeth ending on the middle of the declivous face. Posterior half of the declivous propodeal face weakly marginate. Propodeal spiracle large and below the lower base of the propodeal tooth.



Fig. 47 - *Basiceros onorei* n. sp. from Ecuador. Worker, head in dorsal view (top) and entire profile (bottom).

Petiole with a long neck and with the node high anteriorly and sloping posteriorly. Ventral surface of the petiolar neck anteriorly with a small lamellaceous tooth pointed forwards. Postpetiole almost flat in side view; in dorsal view the anterior and posterior borders well marked by a thicker and anteriorly semitransparent carina.

Gaster oval. Base of the first gastral tergite clearly marginate. Base of the first gastral sternite superficially marginate.

Sculpture. Head reticulate-punctuate and with thin, irregular longitudinal rugosities. Pronotum and mesonotum irregularly reticulate and very superficially punctuate, the reticulation less marked on the posterior half of the mesonotum. Propodeum and pleurae smooth and shining, in addition the pleurae with a few minute punctures. Gaster smooth and shining, in addition the posterior border of the first gastral tergite, the anterior and posterior borders of the first gastral sternite and all remaining tergites and sternites with well impressed, large punctures.

Pilosity. Body with appressed, short, thin, decumbent hairs, very rare on the dorsum of the propodeum and pleurae. Posterior margin of the head dorsum with a row of four clavate erect hairs. Upper antennal scrobes with one clavate erect hair each. Pronotum, mesonotum and posterior half of the petiole and postpetiole with a pair of clavate, erect hairs each. First gastral tergite with four rows of clavate erect hairs, the first up to the third rows with two clavate hairs and the fourth row with four hairs close to the posterior border. Remaining gastral tergites with four clavate hairs, thinner than on the first tergite. First gastral sternite medially with erect, truncate or weakly clavate hairs; posterior half of the first gastral sternite and remaining gastral sternites with clavate hairs much thinner than on the tergites. Apex of the tibiae with a few clavate hairs.

C o l o u r . Dark brown with slightly lighter antennae and legs.

Measurements (in mm) and indices: TL 2.84; HL 0.67; HW 0.74; SL 0.45; ML 0.22; EL 0.06; WL 0.76; CI 110.4.

D i s c u s s i o n . *B. onorei* differs from the 5 known species of the *petiolatum*-group of "*Octostruma*" as defined by BROWN & KEMPF (1960) by the combination of characters listed in the diagnosis. *B. onorei* shares with *iheringi* the head dorsum with irregular rugosities but differs from *iheringi* mainly by the presence of standing hairs on the mesosoma and gaster. *B. onorei* shares with *petiolatum* the

mesosoma and gaster superficially smooth but differs from it mainly by having 6 standing hairs instead of 16 on the head dorsum and by the head weakly instead of broadly convex.

Basiceros papuanum de Andrade n. sp.

Type material: holotype worker (left antenna and left hind tibia and tarsus missing) from Papua New Guinea labelled: Papua NG: Morobe, Wau, 1150 m, 17.V.1992, G. Cuccodoro, # 2C (MHNG). Paratype: 1 dealate gyne (right funiculus missing), same data and collection as the holotype.

Derivatio nominis. "Papuanus" is a neologism indicating the provenance of this species from Papua New Guinea.

Diagnosis. A *Basiceros* species belonging to the "*brevicornis*-group" of "*Eurhopalothrix*" as defined by BROWN & KEMPF (1960) and TAYLOR (1968a), resembling *B. brevicorne* but differing from it by the following combination of characters: erect specialized hairs on the head dorsum 10 (8+2) instead of 16 (8+4+4), first gastral tergite without standing hairs instead of with 3 pairs, and larger size (TL 2.1 mm instead of 1.7-1.8 mm).

Worker description (Fig. 48). Head dorsum gently convex in full dorsal view. Postero-lateral sides of the head with the two anterior thirds diverging posteriorly to a subround angle and the posterior third gently converging into a weakly concave vertexal margin. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending below the eye. Eyes small, with 2 ommatidia in the longest row, placed on the upper margin of the antennal scrobes. With head in profile the scrobes are very distinct, with the upper margin behind the eye with a thin margin, and the lower one thicker and lamellaceous. Anterior clypeal border medially with a broad concavity. Scapes slightly compressed dorso-ventrally, with subbasal strong bend. Antennae with seven segments. Apical funicular joint slightly longer than the rest of the funiculus. Mandibles triangular, with a series of 12 teeth, teeth 3-5-7-9 much longer than the remaining ones.

Mesosoma in profile with pronotum and mesonotum forming a convex arch and basal face of the propodeum strongly sloping posteriorly. Propodeal suture very superficially impressed. Area between

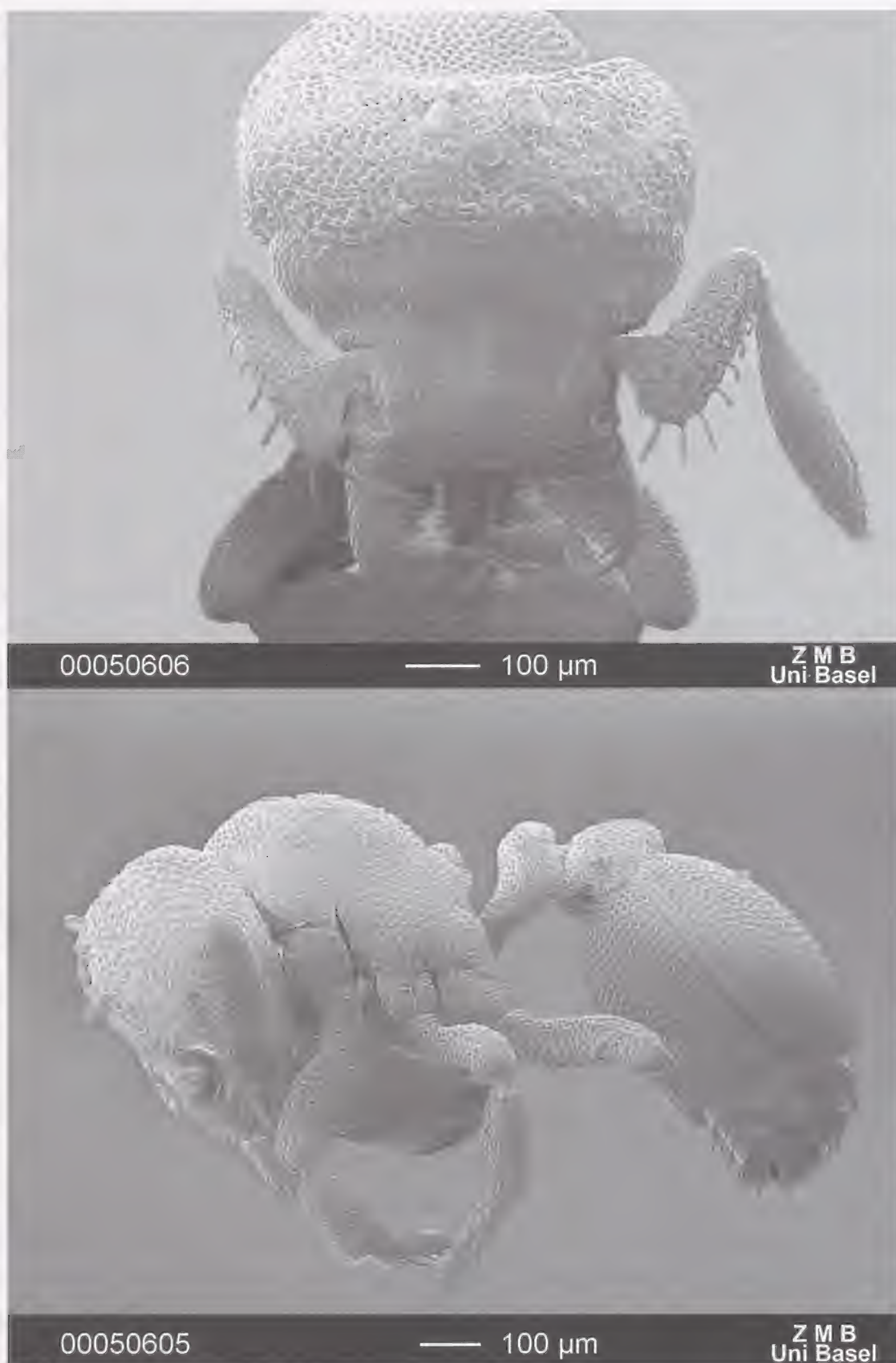


Fig. 48 - *Basiceros papuanum* n. sp. from Papua New Guinea. Head of the gyne in dorsal view (top) and entire profile of the worker (bottom).

basal and declivous faces of the propodeum with a small triangular sub-lamellaceous tooth prolonging to the declivous face as a thin lamella.

Petiole with a long neck and with high, convex node. Petiolar node slightly more than $1/2$ broader than long. Ventral surface of the petiolar neck with a small lamellaceous tooth pointed forwards anteriorly. Postpetiole convex in side view and about $1/2$ broader than long and broadly connected to the gaster.

Gaster oval. Base of the first gastral tergite clearly marginate. Base of the first gastral sternite superficially marginate.

Sculpture. Head, mesosoma, petiole, postpetiole and gaster densely foveolate, the foveae slightly sparser on the first gastral sternite. Legs strongly punctuate.

Pilosity. Body with appressed, short, decumbent hairs, very rare on the anterior face of pronotal dorsum, on the lower pro- and mesopleurae, and on the propodeum, thicker on the remaining part of the pronotum and mesonotum, thinner and slightly longer on the posterior part of the first gastral tergite, longer and decumbent on the posterior half of the first gastral sternite. Frons with two rows of specialized hairs, the anterior row composed by 8 clavate hairs forming an arch connecting the eyes and the posterior row composed by 2 hairs on the middle of the vertex. Remaining gastral tergites and sternites with few, subdecumbent, spatulate hairs. In addition the second, third and fourth gastral sternites with subdecumbent, long and slightly spatulate hairs. Distal outer face of the tibiae and upper outer face of tarsi with one or two thick spatulate hairs each.

C o l o u r . Ferruginous-brown.

Measurements (in mm) and indices: Worker (holotype): TL 2.10; HL 0.48; HW 0.53; SL 0.29; ML 0.13; EL 0.04; WL 0.49; CI 110.4; SI 54.7; MI 27.1.

Gyne description. Similar to the worker but differing in the following details. Eyes large. Ocelli present. Scape and mandibles as in Fig. 48. Mesosoma robust and flat in profile. Parapsidal furrows weakly impressed. Sides of the scutellum converging posteriorly to form a rounded posterior border. Basal face of the propodeum very short and in the same plane as the declivous one. Propodeal tooth and lamellae less developed.

Pilosity. Similar to the worker but the anterior half of the mesonotum with two pairs of short, thin, erect hairs on the centre and each side of the mesonotum with a similar hair as the dorsal ones. Pre-scutellum and scutellum with a clavate hair on each side, thicker on the scutellum.

Gyne (paratype): TL 2.51; HL 0.55; HW 0.62; SL 0.33; ML 0.20; EL 0.13; WL 0.72; CI 112.7; SI 53.2; MI 36.4.

D i s c u s s i o n . The *brevicorne* group is known from the literature to be composed by six species, *australe*, *biroi*, *brevicorne*, *caledonicum*, *philippinum* and *punctatum* (BROWN & KEMPF, 1960; TAYLOR, 1968a). Among these six species, the new species described here as *papuanum*, resembles *brevicorne* in general shape. *B. papuanum* is the sole species of the group having the specialized hairs on the head dorsum distributed in two rows of 8 and 2 hairs each instead of 8:4:4 or 2 or without hairs. TAYLOR (1967) mentions a dealate gyne from N. E. New Guinea (Kunai Creek, Bulolo River Valley) resembling *punctatum* and *brevicorne* or an undescribed species. Later, TAYLOR (1970) suggests that the gyne from Kunai Creek seems unlikely to be *punctatum*. This gyne from Kunai Creek differs from *brevicorne* mainly by the head with 12 hairs divided in two rows of 8:4 instead of 8:4:4, by the first gastral tergite without specialized hairs and by the larger size. It differs from gyne of *papuanum* by the larger values of HL and WL and by the specialized hairs on the head dorsum 8:4 instead of 8:2. Considering the cephalic chaetotaxy the Kunai Creek specimen could be attributed either to a new species very close to *papuanum*, or to true *papuanum*, if one considers that the type material of *papuanum* might have lost both lateral hairs of the second row of hairs on the middle of the vertex.

***Basiceros* sp. nr. *ciliatum* (Mayr)**

Ecuador, Pichincha, S. José de Guaramal, 1,900 m, August 3, 2004, 1 dealate gyne, G. Osella (PUCE).

This specimen should be referred to *B. ciliatum* Mayr, the gyne of which is still unknown. Since this unique gyne is not accompanied by workers, our attribution remains tentative.

Strumigenys veddha de Andrade n. sp.

Type material: holotype worker (unique) from Sri Lanka labelled: Ceylan North central, Alut Oya, 3.II.[19]70, Mussard, Besuchet & Löbl (MHNG).

Derivatio nominis: from the Veddhas, the name of one of the Sri Lanka's indigenous inhabitants. It is used as a noun in apposition.

Diagnosis. A *Strumigenys* belonging to the *lyroessa*-group and to the *prosopis*-complex as defined by BOLTON (2000) and differing from the six species of this complex by the $CI = 73.3$ instead of ≥ 77 , by the cephalic dorsum without standing hairs and by the much more superficial sculpture on the head and mesosoma, and, in particular, from the species *loricata* Bolton, *panopla* Bolton, *prosopis* Bolton and *strenosa* Bolton by the petiole with a pair of standing hairs, and from *anchiplex* Bolton and *propinqua* Bolton by the smaller values of $SI < 57$ instead of ≥ 60 , by the lack of pronotal humeral hairs and by the first gastral tergite with basal and apical pairs of erect hairs only.

Worker description (Fig. 49). Head strongly converging anteriorly, with round vertexal corners and moderately flattened dorsoventrally. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a developed carina visible in full-face view, straight, covering the lower margin of the scrobes and ending in front of the eyes. Eyes small, with 5 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and not visible in dorsal view. Scrobe distinct in profile, with marked upper and lower margins only. Lateral clypeal margin gently converging anteriorly to a straight margin. Scapes less than half of the head length, slightly thicker on the posterior half and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint longer than the rest of the funiculus. Mandibles short, broad proximally and tapered distally; their outer margin convex basally. Apical fork of the mandible with two spiniform teeth, the apicodorsal one larger; space between the two apical spiniform teeth bearing one intercalary denticle. Preapical dentition consisting of 1 spiniform tooth.

Mesosoma in profile slightly flat and gently sloping posteriorly. Propodeal teeth subtended by a broad lamella.

Petiole with a long neck and round node. Ventral surface of the petiole with a broad spongiform lamina. Petiolar node with posterior sides and posterior margin surrounded by spongiform processes. Postpetiole gently convex in profile. Anterior, lateral and posterior

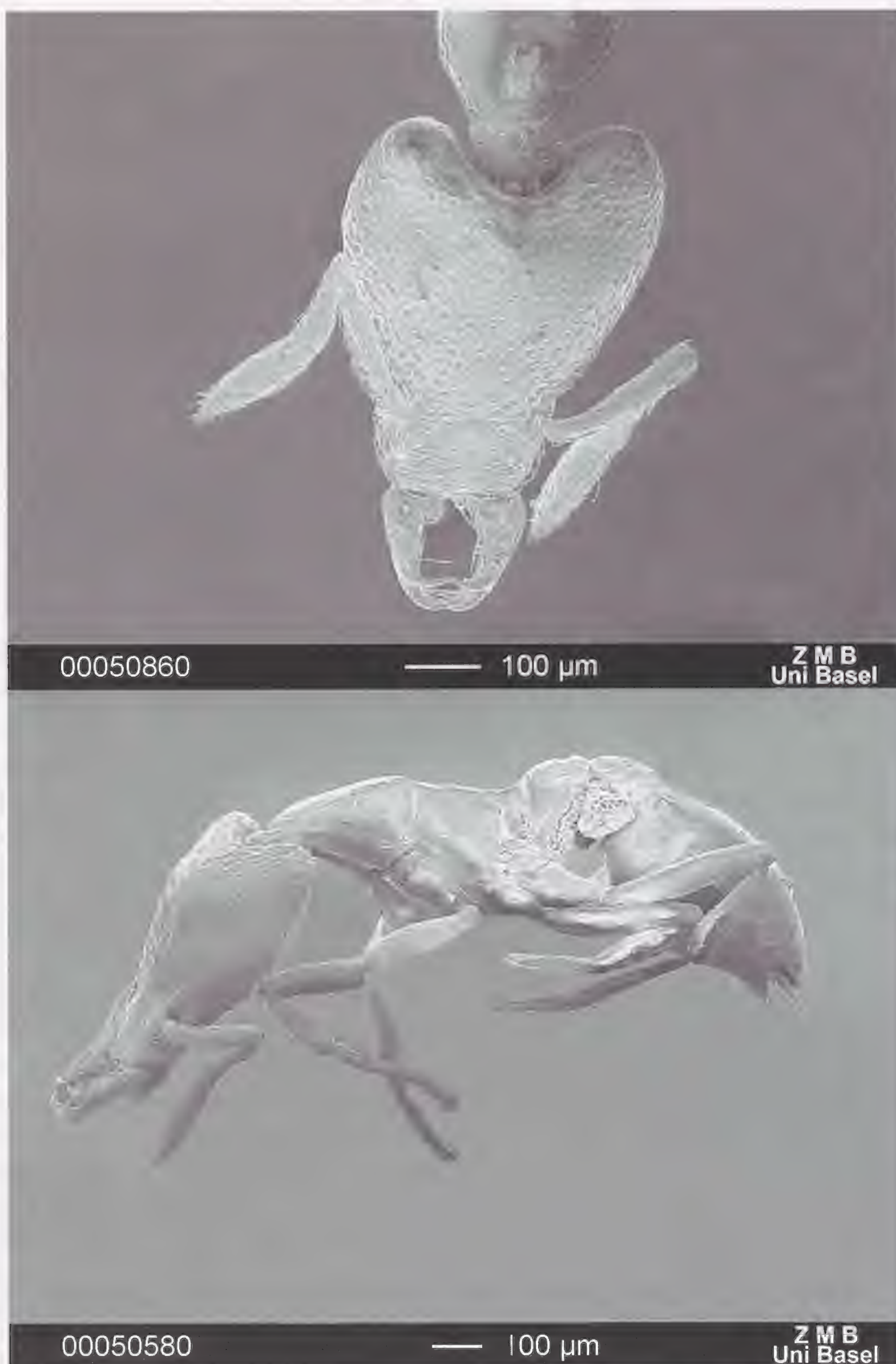


Fig. 49 - *Strumigenys veddha* n. sp. from Sri Lanka. Worker, head in dorsal view (top) and entire profile (bottom).

faces of the postpetiole surrounded by spongiform processes broader posteriorly. Ventral surface of the postpetiole with large and dense spongiform process.

Gaster oval and with a few, short costulae. Base of the first gastral tergite and sternite with spongiform pad larger on the tergite.

Sculpture. Head and anterior half of propleurae finely reticulate-punctuate and superficially shining. Mesosomal dorsum and petiolar node largely smooth and shining, with very sparse, faint, minute reticulation-punctuation. Posterior half of the propleurae and remaining pleurae smooth. Postpetiole and gaster smooth and shining.

Pilosity. Head dorsum with appressed, thin, short hairs only. Upper scrobes margin and leading edge of scape with similar but thicker and slightly longer hairs than on the head dorsum. Apico-scrobal hair missing. Mesosoma, petiole, postpetiole and gaster with hairs similar to those on the head dorsum but much sparser. Mesosoma and postpetiole without erect hairs. Petiole with a pair of stiff standing hairs. First gastral tergite with two pairs of erect stiff hairs, one pair near the base, the other near the apex.

C o l o u r . Light yellowish.

Measurements (in mm) and Indices: TL 2.12; HL 0.58; HW 0.425; SL 0.24; ML 0.17; EL 0.06; WL 0.56; CI 73.3; SI 56.5; MI 29.3.

D i s c u s s i o n . Among the 6 species of the *prosopis*-complex *S. veddha* resembles especially *loricata*. *Veddha* and *loricata* share the cephalic dorsum finely reticulate-punctuate and the promesonotum with sculpture similar to the one on the head but less impressed. But *veddha* differs from *loricata* mainly by the longer head (CI = 73.3 instead of ≥ 82) and by the first gastral tergite with two pairs of stiff hairs, one near to the base and another near to the apex (*loricata* has no standing hairs on the first tergite). Among the six species of the *prosopis*-complex only *veddha* and *panopla* have the first gastral tergite with one pair of stiff hairs near the base and another pair near the apex.

Strumigenys onorei Baroni Urbani & de Andrade n. sp.

Type material: holotype worker from Ecuador labelled: Baños de Agua Santa, Prov. Tungurahua, 01°24'S 78°25'W, 1860 m, sendero Bella Vista, leaf-litter, 26.VIII.2004, Juan Manuel Vieira Correa (PUCE). Paratype: 1 worker, same data and collection as the holotype.

Derivatio nominis. This species is named after Prof Dr Giovanni Onore as a sign of gratitude for his multiple helps during our fieldwork in Ecuador.

Diagnosis. A *Strumigenys* belonging to the *gundlachi*-group and *gundlachi*-complex as defined by BOLTON (2000), resembling *enopla* (Bolton), but differing from it by the smaller SI values (≤ 79.5 instead of ≥ 84), by the shorter propodeal spines, by the postpetiole with the ventral spongiform process larger and by the standing hairs on head and gaster shorter.

Worker description (Fig. 50). Head strongly converging anteriorly and with round vertexal corners. Frontal lobes slightly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending close to the upper border of the eye. Eyes with 3-4 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and partially visible in dorsal view. With the head in profile the scrobe distinct, with the upper margin more marked than the lower one. Lateral clypeal margins gently converging anteriorly into a straight margin. Scapes slightly compressed dorsoventrally, with weak sub-basal bend, about 2/3 of the head length and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint slightly longer than the rest of the funiculus. Mandibles elongate. Apical fork of the mandibles with two teeth and with two intercalary denticles. Preapical dentition consisting of a row with 4-6 minute denticles.

Mesosoma in profile gently sloping posteriorly. Propodeal teeth small and triangular; declivous propodeal face with a narrow lamella.

Petiole with a long pedicel and with the node high and convex. Ventral surface of the petiole without spongiform lamina. Petiolar node with marked posterior margin and without spongiform process. Postpetiole gently convex in profile. Postpetiole with marked anterior face; lateral and posterior faces surrounded by narrow spongiform processes slightly broader on the posterior face. Ventral surface of the postpetiole with spongiform process shorter than the height of the node in profile.

Gaster oval and with few, short costulae. Base of the first gastral tergite with narrow, spongiform pad.

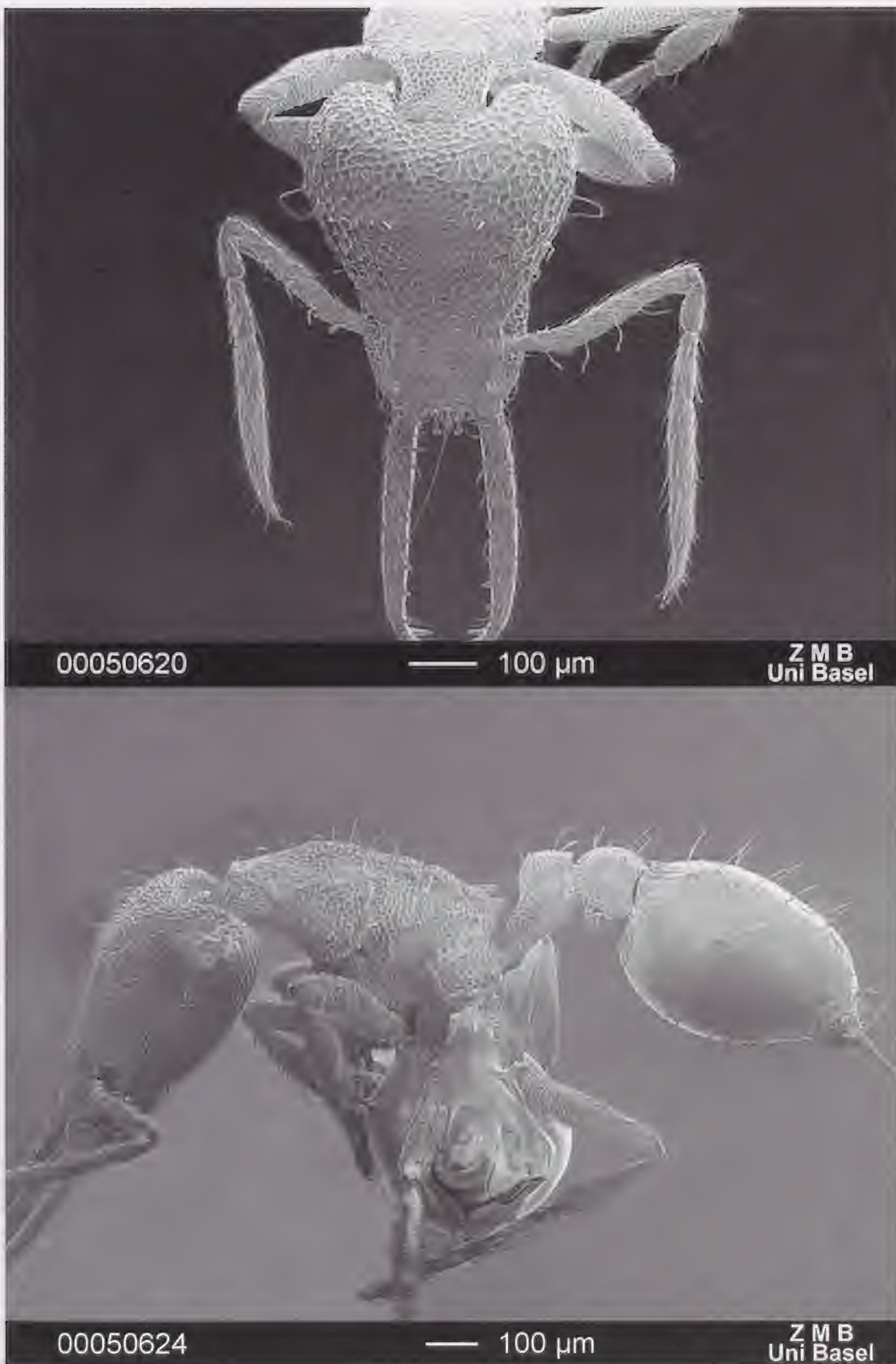


Fig. 50 - *Strumigenys onorei* n. sp. from Ecuador. Worker, head in dorsal view (top) and entire profile (bottom).

Sculpture. Head, mesosoma, petiole and postpetiole reticulate-punctuate. Lower mesopleurae and gaster smooth.

Pilosity. Head and mesosoma with subdecumbent or decumbent, weakly remiform hairs, rarer on the pronotum and mesonotum, missing on the propodeum. Apicoscrobial hair long and flagellate. Cephalic dorsum with two pairs of standing hairs, one close to the vertexal margin and the other close to the highest point of the vertex. Pronotal humeral hair long and flagellate. Mesonotal dorsum with 1 pair of erect, flagellate hairs. The holotype shows on the left side of the mesonotum one erect stiff hair before the flagellate one. This hair is missing in the unique paratype worker. Petiole, postpetiole and first gastral tergite with erect, sparse, weakly remiform hairs slightly longer on the gaster. Posterior half of the first gastral sternites and remaining sternites with appressed and erect pointed hairs.

Colour. Dark brown-black.

Measurements (in mm) and indices: TL 2.10-2.30; HL 0.49-0.54; HW 0.39-0.43; SL 0.31-0.34; ML 0.37-0.39; EL 0.06; WL 0.52-0.58; CI 79.6; SI 79.1-79.5; MI 72.2-75.5.

Discussion. The 15 species of the *gundlachi*-complex can be divided in 4 clusters of closely related species. *S. onorei* can be placed in the *gundlachi* s. str. cluster comprising the following 5 species: *denticulata* Mayr, *eggersi* Emery, *enopla* (Bolton), *gundlachi* (Roger) and *jamaicensis* Brown. Among these five species, *onorei* resembles *enopla*, and both species share the $SI \geq 79$ -100. Of the other species of the *gundlachi* complex, only some specimens of *jamaicensis* and *denticulata* may have SI 80-81, but *jamaicensis* differs from *onorei* and *enopla* by the strongly developed preapical dentition (inconspicuous in *onorei* and *enopla*) and by the larger spongiform process of postpetiole, while *denticulata* differs from both, *onorei* and *enopla* by the pair of erect hairs on the mesonotum shorter and stiff instead of long and flagellate and by the spongiform process of postpetiole much more reduced or absent. *S. onorei* differs from all the 5 species mentioned above by having the smallest propodeal teeth and probably also by the mesonotum with 2 pairs of erect hairs instead of one (see the description). By using the identification key by BOLTON (2000) for the Neotropical species of *Pyramica*, *S. onorei* will fall in the couplet 26 where it can be differentiated from

jamaicensis by using all characters of the first couplet and excluding only “ head slightly shorter and broader, CI 77-85”, and from *enopla* by the following characters: SI < 80, standing hairs on the head about as long as the eye length, spongiform process of the postpetiole at least 1/3 as height to the exposed cuticle of side of postpetiole disc.

Strumigenys longimala de Andrade n. sp.

Type material: holotype worker from Ecuador labelled: Yasuní Scientific Station, Prov. Orellana, 00° 40' 760" S, 76° 23' 032" W, 230 m, leaf-litter, 28.VIII.2004, M. L. de Andrade & C. Baroni Urbani (PUCE). Paratypes: 2 worker and 1 dealate gyne same data and collection as the holotype (PUCE, 1 paratype worker MHNG).

Derivatio nominis: from the Latin *longus* (= long) and *mala* (= mandible), referred to the length of the mandibles, among the longest of the genus.

Diagnosis. A *Strumigenys* belonging to the *trudifera*-group as defined by BOLTON (2000), but differing from the sole species of the group (i. e. *trudifera* Kempf & Brown), in the worker and gyne by the smaller values of SI ≤ 104.5 instead of 108.0, by the propodeal spines shorter, and by the flagellate hairs on the gaster sparser; in the worker only by the smaller values of MI (≤ 103) instead of ≥ 110 ; and in the gyne only by MI 91.6 instead of 102.8.

Worker description (Fig. 51). Head strongly converging anteriorly and with round vertexal angles. Frontal lobes slightly expanded and convex. Anterior half of the dorsal margin of the antennal scrobes broad and ending in a subround denticle over the eyes. Antennal fossae ventrally with a broad carina visible in full-face view, straight and medially denticulate, covering the lower margin of the scrobes and ending close to the upper border of the eye. Eyes with 3 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and partially visible in dorsal view. With the head in profile the scrobes are distinct, almost reaching the vertexal angles, with ventral margin and posterior half of the dorsal margin superficially marked. Lateral clypeal margins gently convex and anteriorly concave in the middle. Postbuccal groove impressed. Scapes subcylindric, slightly more than 2/3 of the head length and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint as long as the rest of the funiculus. Mandibles very

long, about as long as the head length. Apical fork of the mandibles with two teeth and without intercalary denticles. Preapical dentition consisting of one long, spiniform tooth only.

Mesosoma in profile convex anteriorly and slightly raised posteriorly before the propodeal spines. Propodeal spines long but shorter than the basal face of the propodeum; declivous propodeal face with a thin lamella.

Petiole with a long pedicel and with convex node. Ventral surface of the petiole with a thin lamina. Petiolar node with marked posterior margin and with a small spongiform process on the posterior lateral third. Postpetiole convex in profile, with marked anterior and posterior faces; lateral faces surrounded by broad spongiform process. Ventral surface of the postpetiole with very broad spongiform process.

Gaster oval and with costulae on its anterior third. Base of the first gastral tergite and sternite with spongiform pad broader on the sternite.

Sculpture. Head, mesosoma, petiole and postpetiole reticulate-punctuate. Gaster and area between meso- and metapleurae smooth.

Pilosity. Head and mesosoma with subdecumbent or decumbent, narrow spatulate hairs, rarer on the mesosoma. Apicoscrobal hair long and flagellate. Cephalic dorsum with two pairs of standing hairs. Leading edge of the scape with 2 long hairs that curve toward the base of the scape. Pronotal humeral hair long and flagellate. Mesonotum with 1 pair of erect, flagellate hairs. Petiole, postpetiole, first and second gastral tergites with flagellate hairs. Posterior half of the first gastral sternite and remaining sternites with sparse, erect pointed hairs.

C o l o u r . Dark brown.

Measurements (in mm) and indices: TL 2.78-2.94; HL 0.64-0.66; HW 0.44-0.46; SL 0.46-0.48; ML 0.65-0.68; EL 0.05-0.06; WL 0.62-0.64; CI 68.7-69.7; SI 104.3-104.5; MI 101.5-103.0.

Gyne description. Similar to the worker but differing in the following details. Eyes large. Ocelli present. Mesosoma robust and weakly convex in profile. Parapsidal furrows impressed. Sides of the scutellum with a thin lamella converging posteriorly to form an obtuse angle. Basal face of the propodeum declivous posteriorly.

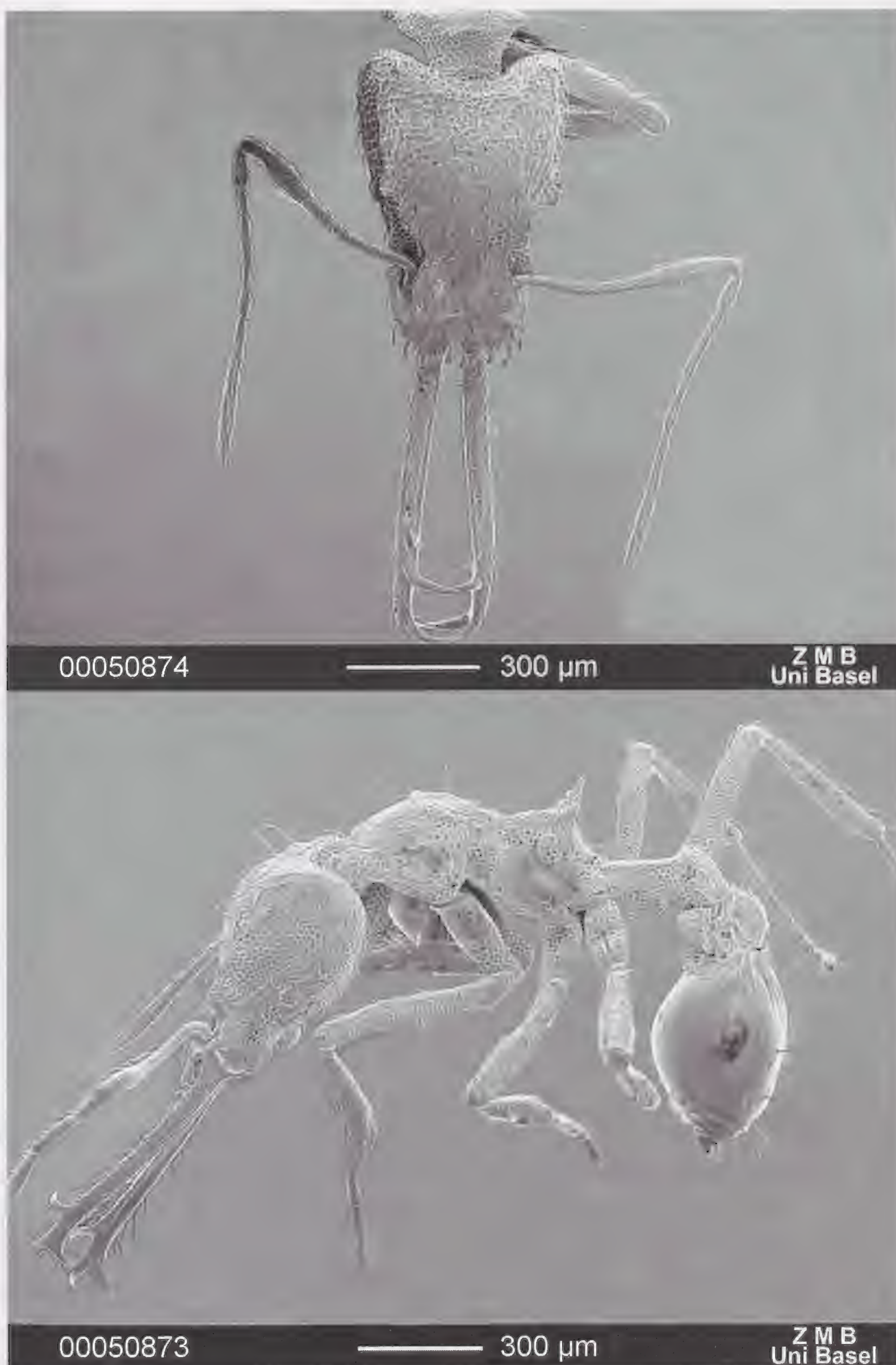


Fig. 51 - *Strumigenys longimala* n. sp. from the Yasuní Scientific Station (Ecuador). Worker, head in dorsal view (top) and entire profile (bottom).

Propodeal spines large and continuing to the declivous face as a lamella.

Ventral surface of the petiole with a broader lamina.

Sculpture. Head and mesosoma with irregular rugosities, more regular and denser on the mesosoma.

Pilosity. Similar to the worker but the mesonotum with 3 pairs of flagellate hairs. Pre-scutellum and scutellum with a flagellate hair on each side.

Measurements (in mm) and indices: TL 3.26; HL 0.72; HW 0.52; SL 0.50; ML 0.66; EL 0.10; WL 0.76; CI 72.2; SI 96.1; MI 92.9.

D i s c u s s i o n . *S. longimala* is obviously the sister species of *trudifera* (Brazil, Colombia and Venezuela) with which it shares all most remarkable traits. Both species constitute the *trudifera*-group characterized by the very long mandibles and by the scape with 2 hairs curved towards the base. *S. longimala* and *trudifera* can be easily separated from all other species of the genus by the values of SI, MI (see diagnosis) and by the number of flagellate hairs on the first gastral tergite. The worker and gyne of *longimala* have 16 and 22 flagellate hairs respectively on the first gastral tergite while those of *trudifera* have 20 and 26.

Strumigenys aduncomala de Andrade n. sp.

T y p e m a t e r i a l : holotype worker (unique) from India labelled: Upper Shillong, 1900 m, 13.V.1976, Meghalaya, W. Wittmer & C. Baroni Urbani (NHMB).

D e r i v a t i o n o m i n i s : from the Latin *aduncus* (= curved), and *mala* (= mandible), referred to the very curved shape of the mandibles.

D i a g n o s i s . A *Strumigenys* belonging to the *caniophanes*-group and to the *caniophanes*-complex as defined by BOLTON (2000), resembling *lacunosa* Lin & Wu, but differing from it by the dorso-lateral margin of the head with 2 instead of 3 hairs projecting laterally, by its smaller size (TL = 2.52 mm instead of 3.1 mm) and by the lower MI (43.7 instead of 50).

Worker description (Fig. 52). Head converging anteriorly, with round vertexal corners. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a narrow carina visible in full-face view, straight, not covering the lower margin of the scrobes and

ending much before the eyes. Eyes small, with 3-4 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and visible in dorsal view. With head in profile the scrobe distinct, with weakly marked upper and lower margins. Lateral clypeal margins gently converging anteriorly into a straight margin. Scapes subcylindrical, about $1/2$ of the head length and surpassing the eyes posteriorly. Antennae with six joints. Apical funicular joint moderately constricted basally and longer than the rest of the funiculus. Mandibles curved. Apical fork of the mandible with two spiniform teeth, the apicodorsal larger; space between the apical teeth bearing one intercalary denticle. Preapical dentition consisting of one tooth.

Mesosoma in profile weakly convex anteriorly and sloping posteriorly. Propodeal teeth pointed; declivous propodeal face marginate only. Mesepisternal hair beds large but smaller than the maximum width of the fore coxa.

Petiole with a long neck and round node. Ventral surface of the petiole with a broad spongiform lamina. Petiolar node with posterior sides and posterior margin surrounded by spongiform process. Postpetiole gently convex in side view. Anterior, lateral and posterior faces of the postpetiole surrounded by spongiform processes broader posteriorly. Ventral surface of the postpetiole with large and dense spongiform process.

Gaster oval and with thin, short costulae. Base of the first gastral tergite and sternite with spongiform pad larger on the tergite.

Sculpture. Head, dorsum of the mesosoma, propleurae and petiole densely reticulate-punctuate. Postpetiole with very sparse, superficial punctures. Meso- and metapleurae and gaster smooth.

Pilosity. Head, mesosoma, petiole and postpetiole with appressed, thin, hairs. Dorsolateral margin of the head in full-face view with 2 freely laterally projecting flagellate hairs, one in apicoscrobal position and one just posterior to the eye. Cephalic dorsum with a transverse row of 4 erect fine hairs along the occipital margin, and with 2 pairs of similar hairs anterior to this, the anterior pair shorter and on the frons and the posterior pair on the middle of the occipital lobes. Pronotal humeral hairs flagellate and long. Dorsum of the pronotum with two pairs of erect fine hairs. Dorsum of the mesonotum with 4 pairs of erect flagellate hairs, the anterior and posterior pairs shorter. Dorsum of the propodeum with rare subdecumbent

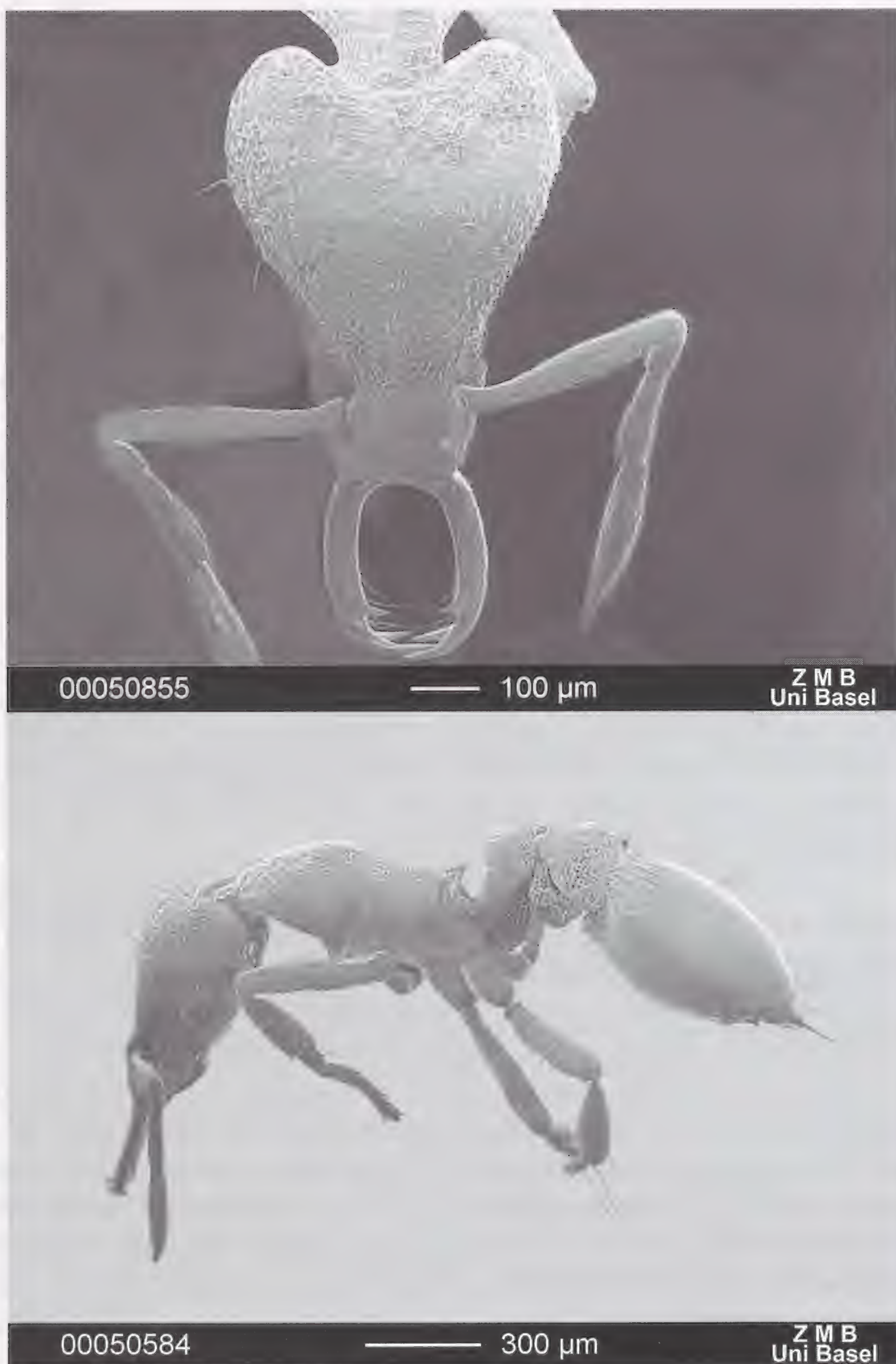


Fig. 52 - *Strumigenys aduncomala* n. sp. from Meghalaya (India). Worker, head in dorsal view (top) and entire profile (bottom).

fine hairs. Petiolar node with three pairs of fine hairs, the posterior pair longer and flagellate. Postpetiole and gaster with long flagellate hairs. Femora and tibiae with a few erect or suberect hairs. Mid- and hind basitarsi with 2 long fine erect hairs.

C o l o u r . Light brownish.

Measurements (in mm) and indices: TL 2.52; HL 0.64; HW 0.46; SL 0.34; ML 0.28; EL 0.04; WL 0.69; CI 71.9; SI 73.9; MI 43.7.

D i s c u s s i o n . Among the 12 species of the *caniophanes*-complex, *aduncomala* resembles more *lacunosa*. *S. aduncomala* and *lacunosa* share the apical funicular segment moderately constricted basally, the dorsum of the pronotum with at least 2 pairs of erect hairs and the dorsum of the mesonotum with about 4 pairs of erect hairs. At first glance *S. aduncomala* superficially resembles *exilirhina* Bolton in general body shape, for having the dorsolateral margin of the head in full-face view with 2 projecting hairs, and for the basal constriction of the apical funicular antennomere. But *exilirhina* belongs to the *mayri*-group whose component species are characterized mainly by the anterior clypeal margin with a U-shaped or V-shaped median notch and by the apical antennomere strongly constricted basally. *S. aduncomala* has the anterior clypeal margin straight and the apical antennomere moderately constricted basally.

Strumigenys caniophanoides de Andrade n. sp.

Type material: holotype worker (unique) from Bhutan labelled: Phuntsholing, 2/400 m, 16.IV.1972, Nat. Hist. Museum Basel-Bhutan Expedition (NHMB).

Derivatio nominis: from the existing *Strumigenys* species name *caniophanes* and the Greek εἶδος (= look), referred to the similarity between *caniophanes* and the new species.

D i a g n o s i s . A *Strumigenys* belonging to the *caniophanes*-group and to the *caniophanes*-complex as defined by BOLTON (2000), resembling *caniophanes* Bolton and *paraposta* Bolton, but differing from *caniophanes* by the mandibles with a preapical denticle (without denticle on *caniophanes*), by the rugae on the side of mesosoma irregular and sparser, and from *paraposta* by its larger size (TL 3.38-3.42 mm instead of 2.9-3.0 mm) and by the dorsolateral margin of the head with more than 5 hairs projecting laterally, and from both, *caniophanes* and *paraposta*, by the SI 80.0-81.7 instead of 68-78.

Worker description (Fig. 53). Head with sides converging anteriorly and with round occipital corners. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending in front of the eyes. Eyes small, with 5 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and visible in dorsal view. With head in profile the scrobe distinct, with weakly marked upper and lower margins. Clypeal dorsum concave medially. Lateral clypeal margin gently converging anteriorly into a straight margin. Scapes subcylindrical, about $3/5$ of the head length and surpassing the eyes posteriorly. Antennae with six joints. Apical funicular joint slightly shorter than the rest of the funiculus. Mandibles elongate, basally and apically weakly convex and medially straight. Apical fork of the mandibles with two spiniform teeth and one intercalary denticle. Preapical dentition consisting of one tooth near the apex.

Mesosoma in profile weakly convex anteriorly and sloping posteriorly. Propodeal teeth pointed; declivous propodeal face marginate only.

Petiole with a long neck and with low and long node. Ventral surface of the petiole with a broad spongiform lamina. Petiolar node with posterior margin surrounded by spongiform process that in profile covers the posterior third of the node's sides. Postpetiole gently convex in side view. Anterior, lateral and posterior faces of the postpetiole surrounded by spongiform processes broader posteriorly. Ventral surface of the postpetiole with large and dense spongiform process.

Gaster oval and with thin, short costulae. Base of the first gastral tergite and sternite with spongiform pad larger on the tergite.

Sculpture. Head coarsely and densely reticulate-punctuate. Mesosoma reticulate-punctuate and with irregular longitudinal rugosities; the rugosities slightly more regular on the pleurae and missing on the lower mesopleurae. Petiole and postpetiole densely reticulate-punctuate. Gaster smooth. Outer face of fore coxae with transversal rugosities.

Pilosity. Head, mesosoma, petiole and postpetiole with appressed, thin hairs. Dorsolateral margin of the head in full-face view with more than 5 freely laterally projecting hairs. Cephalic dorsum at

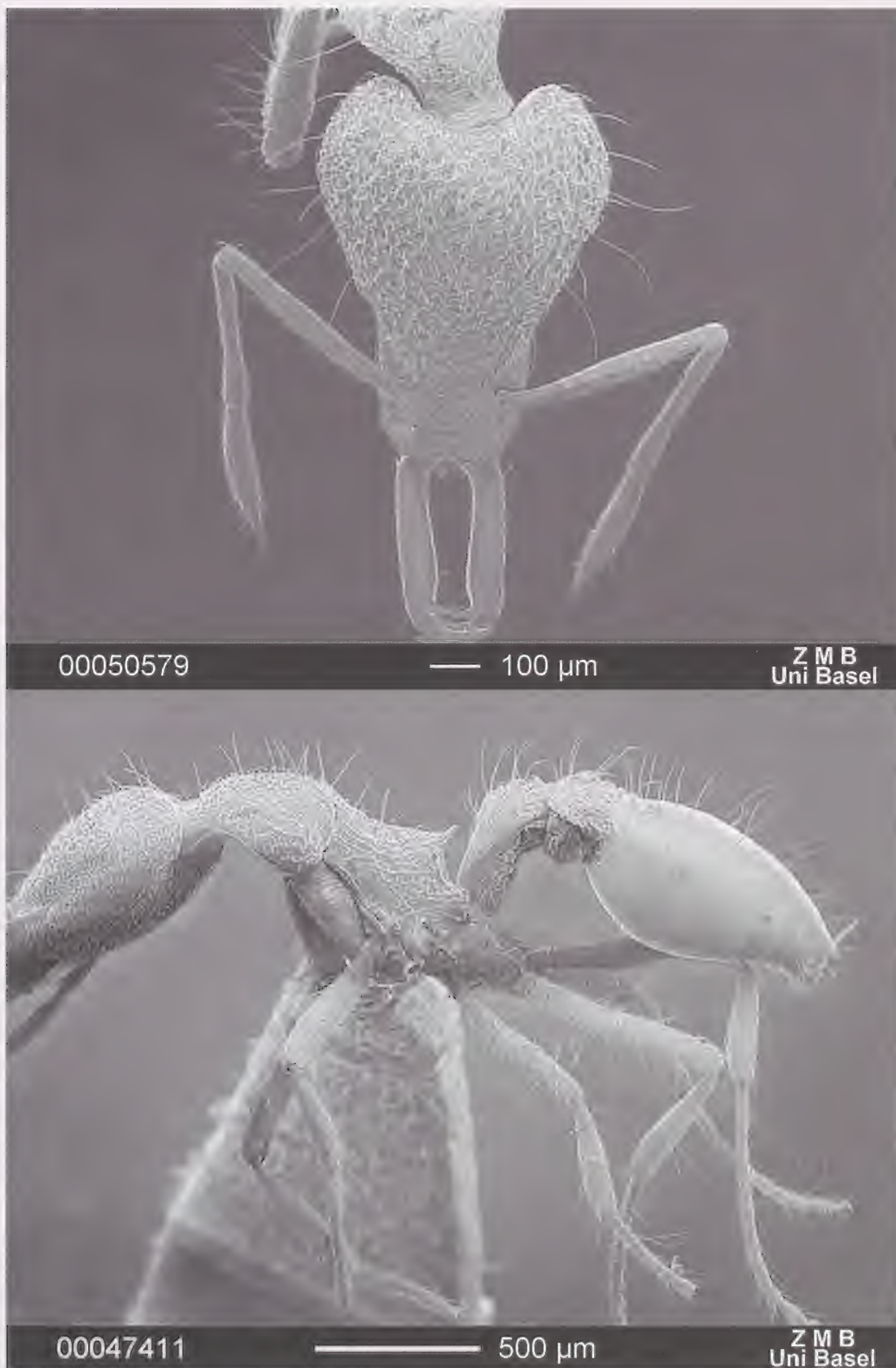


Fig. 53 - *Strumigenys caniophanoides* n. sp. from Bhutan. Worker, head in dorsal view (top) and profile (bottom).

level of the eyes with fine standing hairs of different lengths. Pronotal humeral hairs long and flagellate. Dorsum of the mesosoma, petiole, postpetiole and gaster with erect, fine hairs of different lengths, longer on the gaster. Femora, tibiae and tarsi with numerous erect, fine hairs of different lengths, two of which on the tibiae and two of which on the tarsi much longer than the others.

C o l o u r . reddish brown.

Measurements (in mm) and indices: TL 3.42; HL 0.82; HW 0.60; SL 0.49; ML 0.40; EL 0.08; WL 0.90; CI 73.2; SI 81.7; MI 48.8.

Additional material: Nepal: Prov. Kosi, Distr. Sankhuwasawa, Vallée d'Arun, vic. Num, 1100 m, 21.IV.1984, 1 worker, I. Löbl & A. Smetana (MHNG).

Measurements (in mm) and indices of the Nepalese worker: TL 3.38; HL 0.82; HW 0.60; SL 0.48; ML 0.40; EL 0.08; WL 0.88; CI 73.2; SI 80.0; MI 48.8.

D i s c u s s i o n . Among the 12 species of the *caniophanes*-complex *S. caniophanoides* is particularly similar to *caniophanes* and *paraposta*. *S. caniophanoides* shares with *caniophanes* the large size and the dorsolateral sides of the head in full dorsal view with more than 5 projecting hairs. *S. caniophanoides* shares with *paraposta* the pleurae with irregular rugae, the lower mesopleurae largely smooth and the presence of preapical dentition on the mandibles.

Strumigenys hindu de Andrade n. sp.

T y p e m a t e r i a l : holotype worker (unique) from Nepal labelled: Pokhara, 820 m, 15-18.VI.1976, Nepal, W. Wittmer, C. Baroni Urbani (NHMB).

D e r i v a t i o n o m i n i s : the Hindu religion, one of the two major religions of Nepal is used here as a noun in apposition.

D i a g n o s i s . A *Strumigenys* belonging to the *godeffroyi*-group and to the *godeffroyi*-complex as defined by BOLTON (2000), resembling *uberyx* Bolton and *buddhista* de Andrade (q. v.), but differing from these two species by its larger size (TL = 2.5 mm instead of 1.8-1.9 mm) and by the SI = 102.6 (instead of ≤ 91).

Worker description (Fig. 54). Head sides converging anteriorly, with round vertexal corners. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a marked carina vis-

ible in full-face view, straight, covering the lower margin of the scrobes and ending close to the eyes. Eyes small, with 2 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and slightly visible in dorsal view. With the head in profile the scrobe distinct, with superficially marked upper and lower margins. Clypeal dorsum gently concave medially. Lateral clypeal margin gently converging anteriorly into a straight margin. Scapes subcylindrical, about $2/3$ of the head length and surpassing the eyes posteriorly. Antennae with six joints. Apical funicular joint much longer than the rest of the funiculus. Mandibles curved. Apical fork of the mandibles with two spiniform teeth and with two intercalary denticles. Preapical dentition consisting of one spiniform tooth near the apex.

Mesosoma in profile weakly convex anteriorly and sloping posteriorly into the gently convex basal face of the propodeum. Propodeal teeth pointed and ventrally connected to a medially convex lamella.

Petiole with a long neck and with the node high, dorsally almost flat and anteriorly tumuliform. Ventral surface of the petiole with a broad spongiform lamina. Petiolar node with posterior margin and whole sides surrounded by spongiform process. Postpetiole gently convex in side view. Anterior, lateral and posterior margins of the postpetiole surrounded by spongiform processes. Ventral surface of the postpetiole with large and dense spongiform process.

Gaster oval and with thin, short costulae. Base of the first gastral tergite and sternite with spongiform pad larger on the tergite.

Sculpture. Head reticulate and minutely punctuate. Pronotum, pleurae and declivous face of the propodeum smooth. Mesonotum, basal face of the propodeum and petiole punctuate, the punctures fainter and sparser on the petiole. Postpetiole and gaster smooth.

Pilosity. Head, mesosoma, petiole and postpetiole with appressed, thin hairs. Dorsolateral margin of the head in full-face view with the apicoscrobal flagellate hair only. Cephalic dorsum with three rows of erect hairs, the first row with 4 hairs close to the occipital margin, the second row with 4 standing hairs and the third row with 2 hairs on the frons. Upper scrobal margin with narrow spoon-shaped hairs curved anteriorly. Clypeal border with hairs similar to those of the upper scrobe. Scapes with hairs also similar to those on the upper

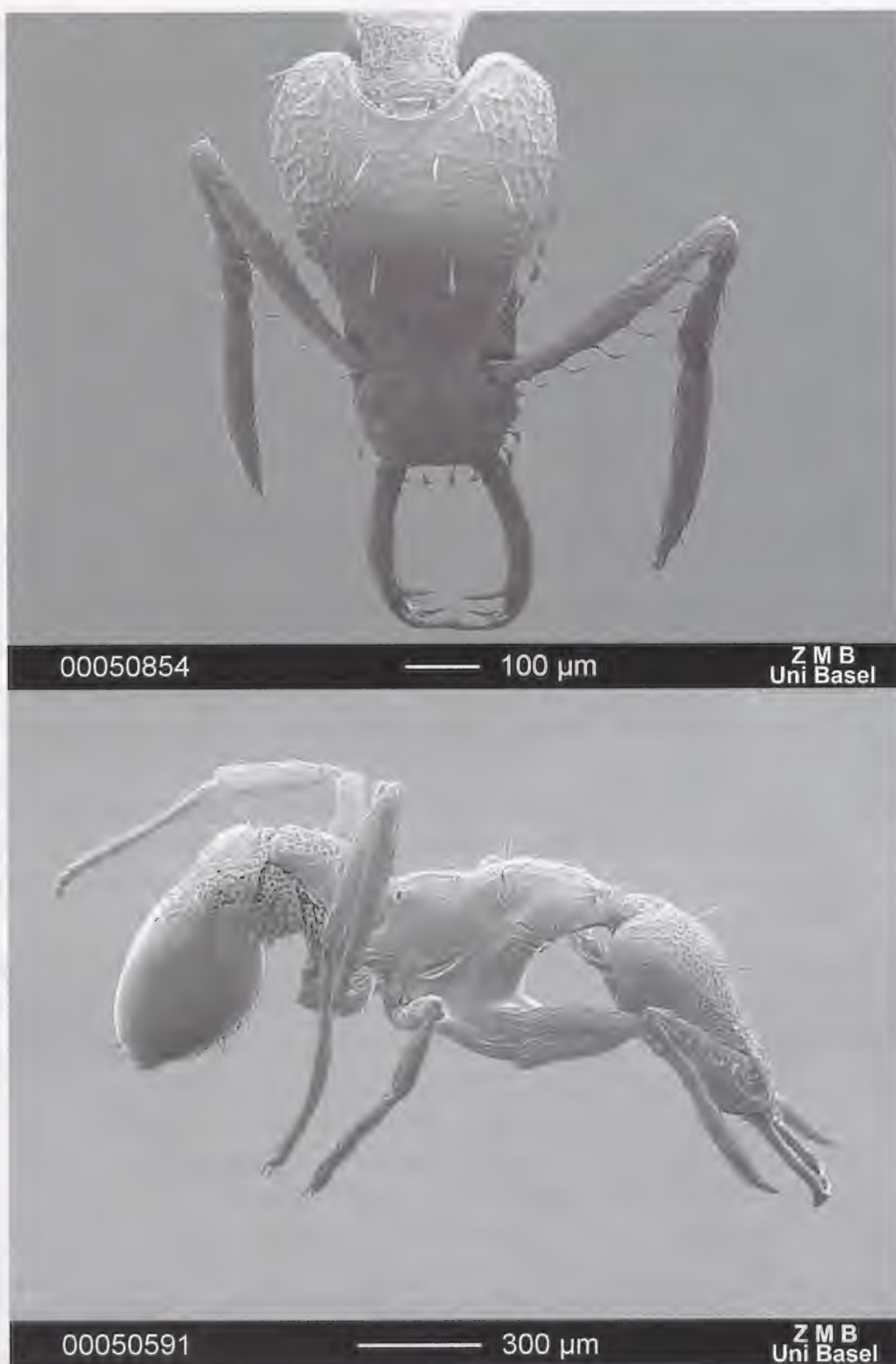


Fig. 54 - *Strumigenys hindu* n. sp. from Nepal. Worker, head in dorsal view (top) and entire profile (bottom).

scrobes and curved posteriorly. Pronotal humeral hairs long and flagellate. Dorsum of the pronotum with a pair of erect long hairs. Mesonotum with a pair of erect flagellate hairs. Petiole, postpetiole and gaster with few erect flagellate hairs. Dorsal face of hind femora with an erect fine hair on the basal third. Outer face of mid and hind tibiae with an erect, long flagellate hair. Hind basitarsi with 1-2 pairs of erect, long flagellate hairs.

C o l o u r . light brown.

Measurements (in mm) and indices: TL 2.50; HL 0.62; HW 0.38; SL 0.39; ML 0.26; EL 0.03; WL 0.66; CI 61.3; SI 102.6; MI 41.9.

D i s c u s s i o n . *S. hindu*, *uberyx* and *buddhista* are very similar each other but the characters listed in their respective species diagnosis separate them clearly.

Strumigenys buddhista de Andrade n. sp.

T y p e m a t e r i a l : holotype worker (unique) from Nepal labelled: Pokhara, 820 m, 15-18.VI.1976, Nepal, W. Wittmer, C. Baroni Urbani (NHMB).

D e r i v a t i o n o m i n i s : name derived from the Buddhism, the second major religion in Nepal.

D i a g n o s i s . A *Strumigenys* belonging to the *godeffroyi*-group and to the *godeffroyi*-complex as defined by BOLTON (2000), resembling *uberyx* and *hindu*, but differing from *uberyx* by the mandibles longer and with less convex sides and by the anterior face of the petiolar node more protruding anteriorly, and from *hindu* by its smaller size (TL 1.96 mm instead of 2.50 mm), by the smaller SI (90.9 instead of SI = 102.6), and from both, *uberyx* and *hindu*, by the standing hairs on the head dorsum, less numerous.

Worker description (Fig. 55). Head sides converging anteriorly, with round vertexal corners. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending close to the eyes. Eyes small, with 2 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and slightly visible in dorsal view. With the head in profile the scrobe distinct, with superficially marked upper and lower margins. Clypeal dorsum weakly concave medially. Lateral clypeal margin

gently converging anteriorly into a straight margin. Scapes subcylindrical, about $3/5$ of the head length and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint longer than the rest of the funiculus. Mandibles diverging anteriorly and curved on the two anterior thirds. Apical fork of the mandibles with two spiniform teeth and with one intercalary denticle. Preapical dentition consisting of one spiniform tooth near the apex.

Mesosoma in profile with weakly convex mesonotum and with a longitudinal carina starting from the mesonotum and ending on the anterior half of the basal face of the propodeum; the carina thicker and shaped as a small triangular protuberance on the propodeum. Posterior half of the propodeum declivous. Propodeal teeth pointed and ventrally connected to a lamella.

Petiole with a long neck and with the node high, weakly convex dorsally and broadly tumuliform anteriorly. Ventral surface of the petiole with a broad spongiform lamina. Petiolar node with posterior margin and posterior sides surrounded by spongiform process. Postpetiole gently convex in profile. Anterior, lateral and posterior margin of the postpetiole surrounded by spongiform processes. Ventral surface of the postpetiole with large and dense spongiform process.

Gaster oval and with few, thin, very short costulae. Base of the first gastral tergite and sternite with a spongiform pad larger on the tergite.

Sculpture. Head minutely reticulate-punctuate. Pronotum, pleurae and declivous face of the propodeum smooth; in addition the pronotum with a few sparse punctures. Mesonotum, basal face of the propodeum and petiole punctuate. Postpetiole and gaster smooth.

Pilosity. Head, mesosoma, petiole and postpetiole with appressed hairs, denser on the petiole. Dorsolateral margin of the head in full-face view with only the apicoscrobal flagellate hairs. Cephalic dorsum with three rows of erect hairs, the first row with 4 hairs close to the occipital margin, the second row with 2 standing hairs and the third row with 2 standing hairs on the frons. Upper scrobal margin with narrowly spoon-shaped hairs curved anteriorly. Clypeal border with similar hairs as the upper scrobe. Scapes with similar hairs as the upper scrobes and curved posteriorly. Pronotal humeral hairs long and flagellate. Dorsum of the pronotum with a pair of erect, long flagellate hairs. Mesonotum

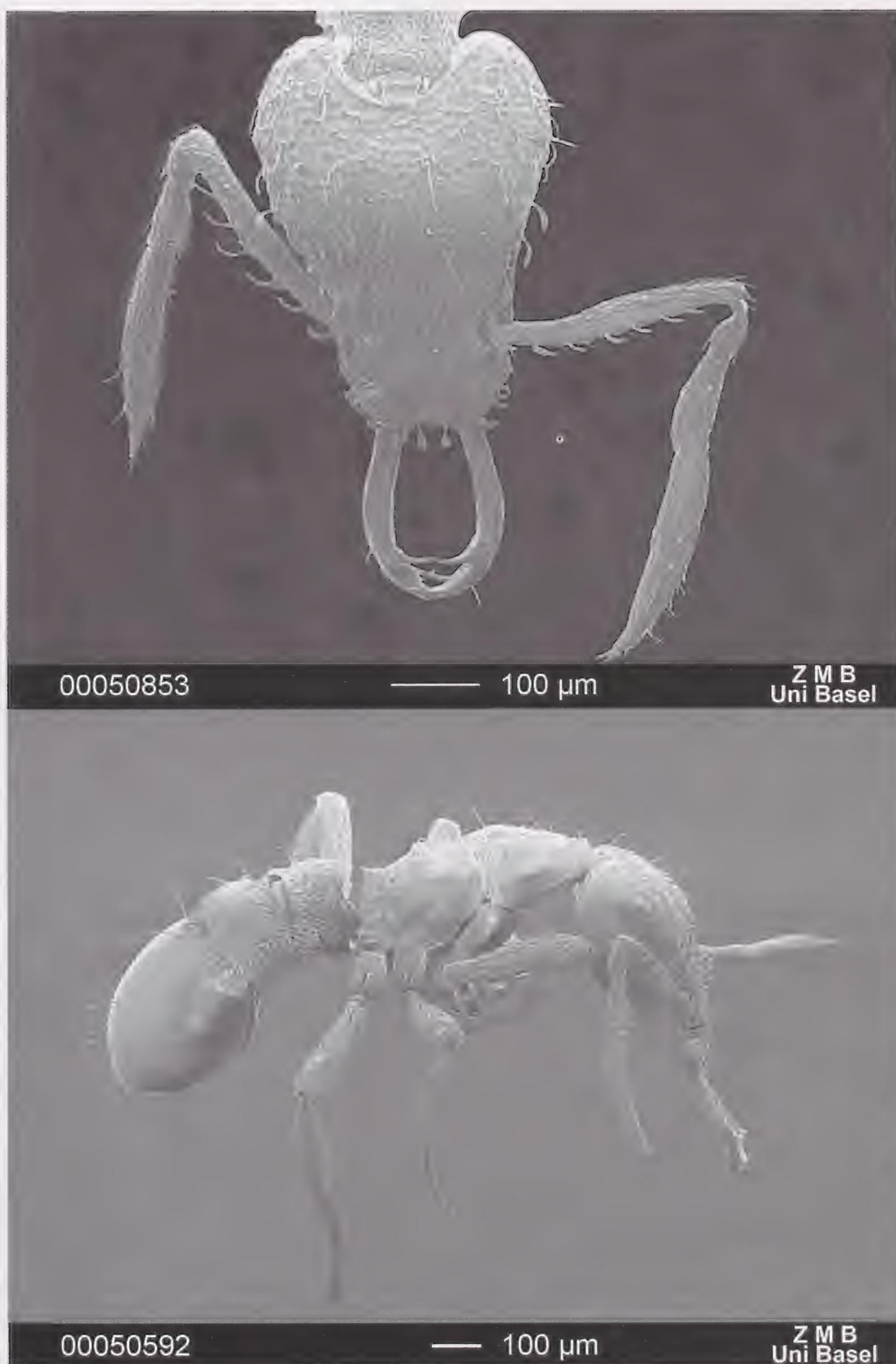


Fig. 55 - *Strumigenys buddhista* n. sp. from Nepal. Worker, head in dorsal view (top) and entire profile (bottom).

with a pair of erect, flagellate hairs. Petiole, postpetiole and gaster with few erect flagellate hairs. Outer face of mid and hind tibiae with an erect, long, flagellate hair. Hind basitarsi with 1 pair of erect, long, flagellate hairs.

C o l o u r . light brown.

Measurements (in mm) and indices: TL 1.96; HL 0.50; HW 0.33; SL 0.30; ML 0.23; EL 0.02; WL 0.51; CI 66.0; SI 90.9; MI 46.0.

D i s c u s s i o n . *Strumigenys buddhista* is very similar to *uberyx* and *hindu*. These three species have similar body sculpture but the number of standing hairs on the head dorsum helps to separate them. The three rows of standing hairs on the head dorsum are placed as follows: 1 row close to the vertexal margin, 1 row at the same line as the dorsolateral flagellate hairs and 1 row at the level of the eyes. In *buddhista* the rows have 4,2,2 hairs, in *uberyx* the rows have 4,4,4 hairs and in *hindu* the rows have 4,4,2 hairs. Besides the differences in the number of standing hairs on the head dorsum, *buddhista* differs from *uberyx* and *hindu* by the higher value of MI (46 instead of MI 41-42 as in *uberyx* and *hindu*). In addition, *buddhista* and *uberyx* share the small size and *buddhista* and *hindu* share the anterior face of the petiole protruding anteriorly and tumuliform.

Strumigenys nageli Baroni Urbani & de Andrade n. sp.

T y p e m a t e r i a l : holotype worker from Ecuador labelled: Esmeralda, Rioverde, Via San Lorenzo, Km 67, leaf-litter, 22.VIII.2004, C. Baroni Urbani & M. L. de Andrade (PUCE). Paratypes: 4 workers, same data as the holotype (PUCE, MSNG).

D e r i v a t i o n o m i n i s : this species is named after Prof Dr Peter Nagel.

D i a g n o s i s . A *Strumigenys* belonging to the *elongata*-group as defined by BOLTON (2000), resembling *spathula* Lattke & Goitía but differing from it by the apicoscrobal hairs short and spatulate instead of long and flagellate, by the humeral hairs long and thicker in their distal half, instead of long and filiform and by the spatulate standing hairs on the gaster, longer and thinner.

W o r k e r d e s c r i p t i o n (Fig. 56). Head sides converging anteriorly, with round vertexal corners. Frontal lobes weakly expanded and convex. Antennal fossae ventrally with a narrow carina visible in

full-face view, straight, not covering the lower margin of the scrobes and ending close to the eyes. Eyes small, with 4 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes, and visible in dorsal view. With head in profile the scrobe distinct, with marked upper margin only. Clypeus triangular. Lateral clypeal margin gently converging anteriorly to a straight or gently concave margin. Scapes subcylindrical, about $2/3$ of the head length and largely surpassing the eyes posteriorly. Antennae with six joints. Apical funicular joint much longer than the rest of the funiculus. Mandibles elongate. Apical fork of the mandible with two spiniform teeth and without intercalary denticles.

Mesosoma in profile weakly convex anteriorly and sloping posteriorly to the convex basal face of the propodeum. Propodeal teeth pointed. Declivous face of the propodeum with a very faint margin.

Petiole with a long neck, the node high and convex dorsally. Ventral surface of the petiole with a narrow lamina on the anterior third. Petiolar node with posterior margin surrounded by spongiform process. Postpetiole convex in profile. Anterior and posterior margins of the postpetiole surrounded by spongiform processes, the process narrow on the anterior margin. Ventral surface of the postpetiole with dense spongiform process.

Gaster oval and with thin, short costulae. Base of the first gastral tergite and sternite with spongiform pad irregular on the sternite.

Sculpture. Head, mesosoma, petiole and postpetiole reticulate-punctuate, this sculpture less marked on the postpetiole. Centre of the lower mesopleurae smooth. Gaster smooth.

Pilosity. Head, mesosoma, petiole and postpetiole with subdecumbent or decumbent, spatulate hairs, very sparse on the mesosoma and rare on the pedicel. Apicoscrobial hair spatulate. Cephalic dorsum with one pair of standing spatulate hairs close to the occipital margin. Humeral hairs long, increasing in width from mid-length to near the apex and apically gently pointed or truncate. Mesonotal dorsum with 1 pair of erect hairs similar to the humeral ones but shorter. Petiole, postpetiole and gaster with erect, long, spatulate hairs very sparse on the pedicel.

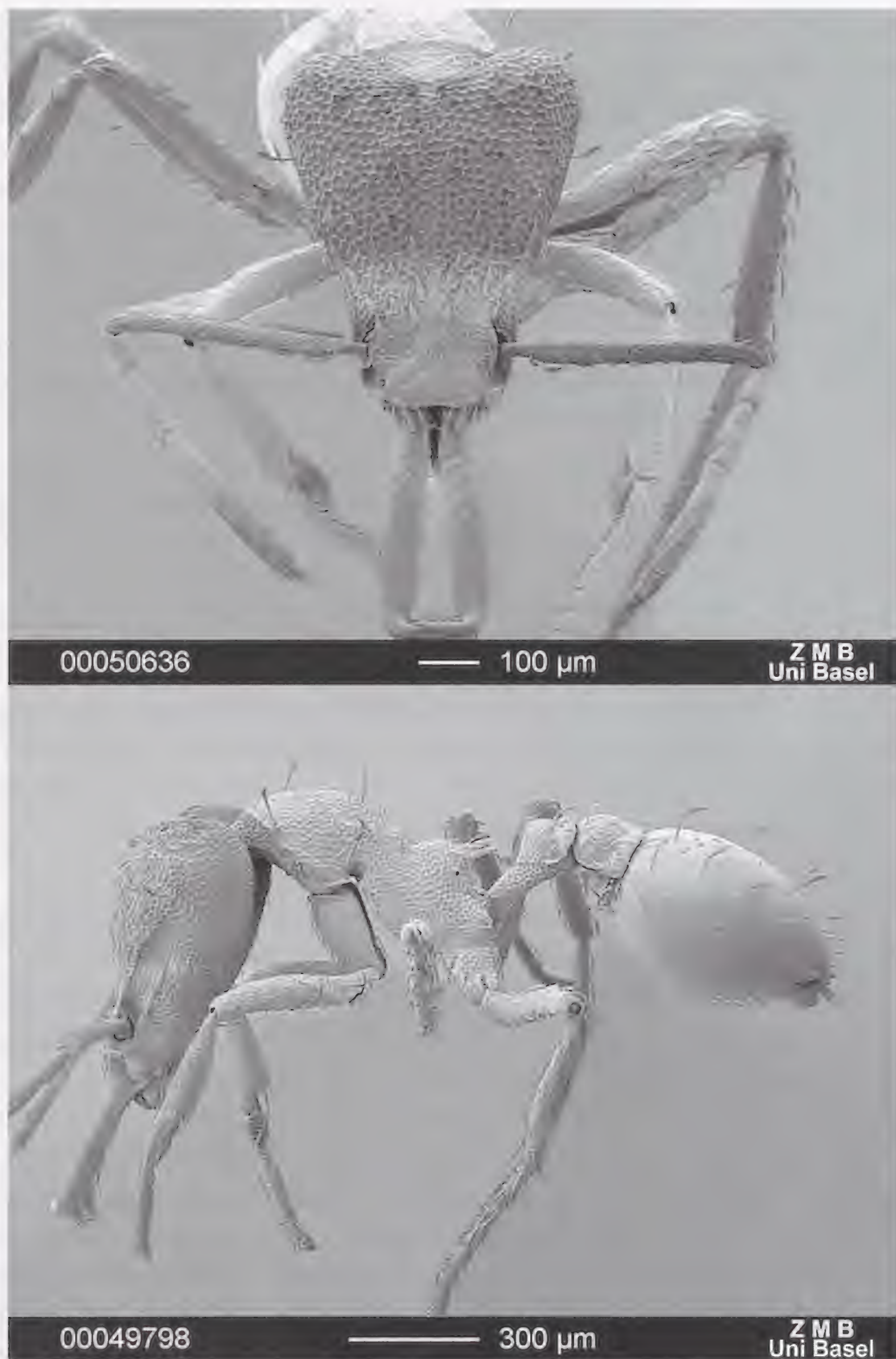


Fig. 56 - *Strumigenys nageli* n. sp. from Ecuador. Worker, head in dorsal view (top) and entire profile (bottom).

C o l o u r . brown with slightly darker gaster.

Measurements (in mm) and indices: TL 2.44-2.58; HL 0.63-0.66; HW 0.49-0.50; SL 0.45; ML 0.38-0.40; EL 0.05-0.06; WL 0.60-0.65; CI 75.7-77.7; SI 90.0-91.8; MI 60.3-60.6.

D i s c u s s i o n . *S. nageli* is very similar to *spathula* from Venezuela, Trinidad and Central America but the characters listed in the diagnosis permit easy separation of the two species.

Strumigenys aequinoctialis de Andrade n. sp.

T y p e m a t e r i a l : holotype and paratype workers from Ecuador (Pichincha) labelled: km 38 road Calacalí - La Independencia, 21.VIII.2004, 2000 m, leaf litter, C. Baroni Urbani & M. L. de Andrade (MSNG).

D e r i v a t i o n o m i n i s : from the Latin *aequinoctialis* (=equinoctial), the closest concept to the Equator in Roman times.

Diagnosis. A *Strumigenys* belonging to the *schulzi*-group as defined by BOLTON (2000), resembling *umboceps* (Bolton), but differing from it by its standing hairs much longer, by its propodeal spines longer, by its vertex with 4 longer, erect hairs, by its larger size and darker colour.

Worker description (Fig. 57). Head strongly converging anteriorly and with round vertexal corners. Head in profile with posterior half strongly tumuliform. Frontal lobes slightly expanded and convex. Antennal fossae ventrally with a carina visible in full-face view, straight, covering the lower margin of the scrobes and ending before the upper border of the eye. Eyes with 4-5 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes. With the head in profile the scrobe is superficial, with the upper and lower margins weakly marked. Anterior clypeal margin broadly convex. Scapes slightly compressed dorsoventrally, with sub-basal bend, about half of the head length and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint longer than the rest of the funiculus. Mandibles short, triangular. Basal tooth broad, subtriangular and followed by 11 teeth or denticles. Tooth 1 (basal), 2 and 3 the longest, subequal in size, tooth 4 smaller than 1-3, tooth 5 slightly shorter than teeth 1-3, teeth 6-10 diminishing in size apically, apical tooth small but pointed.

Mesosoma in profile convex anteriorly and gently sloping posteriorly. Propodeal teeth pointed and subtended by a carina.

Petiole with node high and convex and with long peduncle. No spongiform processes on the petiole, except a very thin whitish carina on its posterior border. Postpetiole broadly convex, with developed spongiform processes ventrally. Anterior and posterior postpetiolar borders with a narrow spongiform crest, the crest broader posteriorly.

Gaster oval and with few, short costulae. Base of the first gastral tergite with narrow limbus. Base of the first gastral sternite with narrow spongiform pad.

Sculpture. Head, mesosoma and petiole reticulate-punctuate. Mesopleurae largely smooth. Postpetiole and gaster smooth and shining, except a few reticulations on the posterior half of the postpetiolar dorsum.

Pilosity. Head, mesosoma and petiole with suberect or subdecumbent, spatulate hairs, slightly shorter on the clypeus, sparser on the mesosoma and rare on the petiole. Apicoscrobial hair absent. Cephalic dorsum with 4 long, erect hairs, slightly thicker on the apical half. Leading edge of the scapes with spatulate hairs curved basally and apically. Lateral clypeal margins with spatulate hairs curved anteriorly. Pronotal humeral hair present, long and weakly flagellate. Sides of the mesonotum with 1 erect, long, truncated, hair. Petiole, postpetiole, and gaster with erect-suberect, truncated hairs, rare on the petiole.

Colour. Holotype dark brown; paratype reddish brown with darker gaster.

Measurements (in mm) and indices: TL 2.30-2.60; HL 0.62-0.72; HW 0.45-0.52; SL 0.31-0.36; ML 0.11-0.15; EL 0.06-0.09; WL 0.63-0.74; CI 72.2-72.6; SI 68.8-69.2; MI 17.7-20.8.

Discussion. *S. aequinoctialis* and its closest relative, *umboceps* (Bolton) occupy an isolate position within the genus for their high-domed cephalic capsule. *S. aequinoctialis* is easily distinguished from *umboceps* for the four long hairs behind the highest point of the vertex as already described in the diagnosis. The two *aequinoctialis* specimens differ from the holotype unique of *umboceps* in the MCZC also for the presence of standing hairs on the mesosoma. Since there are differences in the number of hairs also between the *aequinoctialis* holotype and paratype, one cannot exclude that the *umboceps* unique had lost all its standing hairs during manipulation.

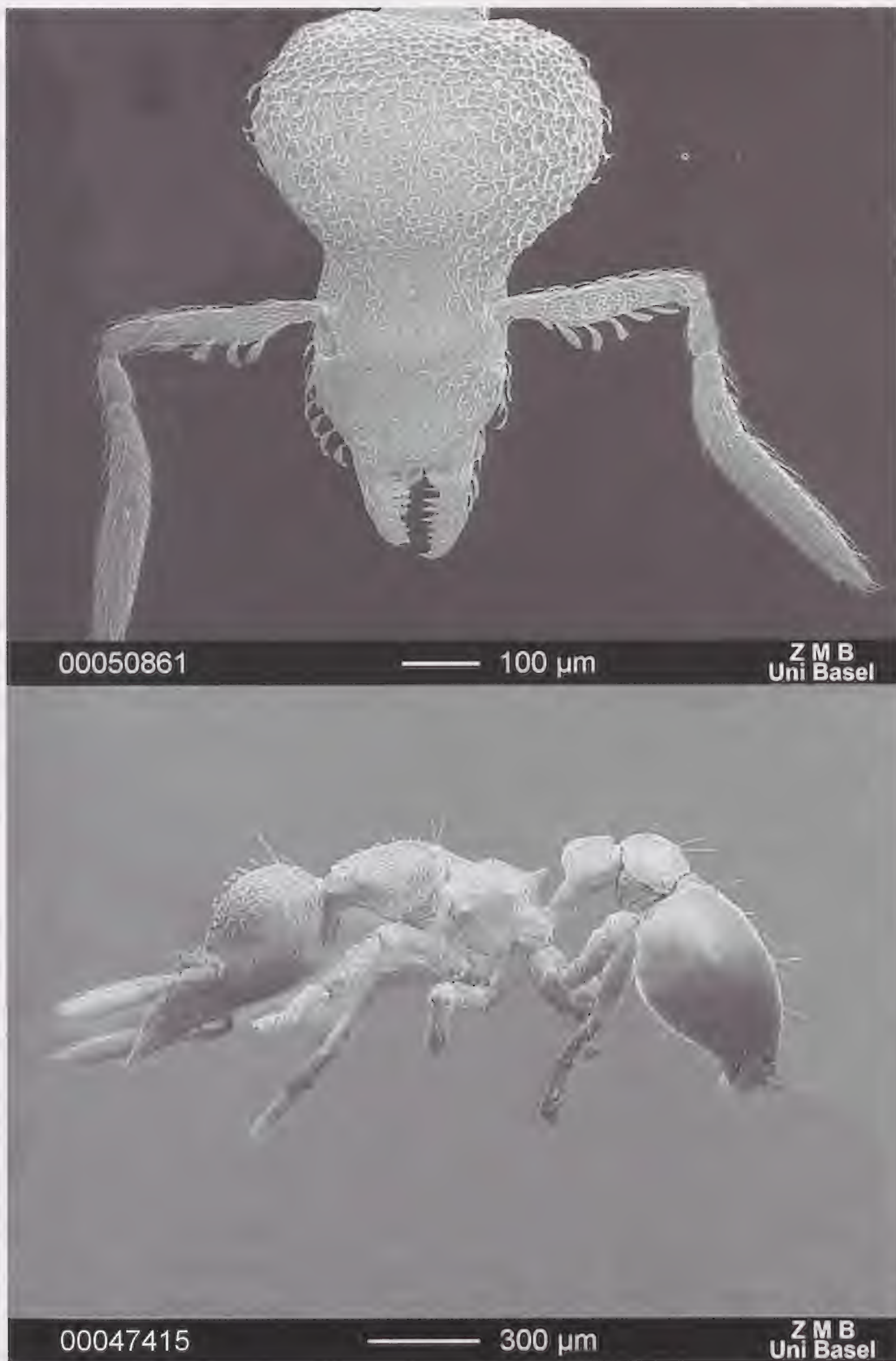


Fig. 57 - *Strumigenys aequinoctialis* n. sp. from Ecuador. Worker, head in dorsal view (top) and entire profile (bottom).

†*Strumigenys pilosula* de Andrade n. sp.

Type material: holotype, winged gyne (unique) in Dominican amber (GOPC) No. H 10-190.

Derivatio nominis: *pilosulus* is the diminutive of the Latin adjective *pilosus* (= hairy) and is referred to the smaller number of macrochaetae that differentiate this species from its closest relative, *S. schleorum* Baroni Urbani.

Diagnosis. A *Strumigenys* species resembling the fossil *schleorum* but differing from it by having 4 standing hairs close to the vertexal margin instead of 2, by a pair of standing hairs close to the ocelli (no such hairs in *schleorum*), and by the leading edge of scape without freely projecting hairs instead of with freely projecting hairs.

Gyne description (Figs. 58, 59, 60). Head strongly converging anteriorly and with round vertexal corners. Frontal lobes slightly expanded and convex. Antennal fossae ventrally with a marked carina visible in full-face view, straight, covering the lower margin of the scrobes and ending close to the upper border of the compound eyes. Compound eyes large, very protruding, occupying large part of the posterior half of the antennal scrobe, and largely visible in dorsal view. Ocelli developed. With the head in profile the scrobes are superficial, with the upper margin indistinct and the lower one marked anteriorly only. Lateral clypeal margin converging anteriorly into an anterior convex margin weakly tumuliform medially. Scares weakly dorsoventrally compressed, with sub-round bend, slightly less than 1/2 of the head length and slightly surpassing the eyes posteriorly. Antennae with six joints. Apical funicular joint slightly longer than the rest of the funiculus. Mandibles about 1/2 of the head length, touching each other only at the apex when opposed, with slightly convex external borders. Internal border of the mandibles with a broad basal lamella followed by a row of minute, poorly differentiated denticles and by a single spiniform tooth. Labral lobes large and partially visible between the mandibles.

Mesosoma robust and gently convex in profile. Parapsidal furrows weakly impressed. Scutellum with the sides converging posteriorly and with the posterior border rounded. Basal face of the propodeum long and declivous posteriorly; its sides marginate and its dorsum gently concave. Area between basal and declivous faces



Fig. 58 - *Strumigenys pilosula* n. sp. from Dominican amber. Gyne, profile. Distance between two scale bars 0.1 mm.



Fig. 59 - *Strumigenys pilosula* n. sp. from Dominican amber. Gyne, head in dorsal view. Distance between two scale bars 0.1 mm.



Fig. 60 - *Strumigenys pilosula* n. sp. from Dominican amber. Gyne, head and mesosoma in profile showing the pilosity. Distance between two scale bars 0.1 mm.

of the propodeum with a lamellaceous, pointed, transparent tooth that prolongs to the declivous face as a broad lamella.

Petiole with a long neck and with the node high and convex. Ventral surface of the petiole without spongiform lamina. Petiolar node with marked posterior margin and without spongiform process. Postpetiole convex in profile and without spongiform processes.

Gaster oval. Base of the first gastral tergite with developed anterior transverse cuticular ridge.

Sculpture. Head, mesosoma, petiole and postpetiole minutely reticulate, the reticulation more superficial on the postpetiolar dorsum. Mesopleurae, lower metapleurae and gaster smooth.

Pilosity. Dorsum of the head and scapes with sparse, weakly remiform hairs, subdecumbent on the head and appressed on the scapes. Leading edge of the scapes without free hairs. Border of the clypeus with few, free, weakly remiform hairs pointed medially. Apicoscrobal hair slightly pointed. Cephalic dorsum with 4 standing hairs close to the vertexal margin and a pair of hairs close to the ocelli. Pronotal humeral hairs long. Sides of the mesonotum with 2 pairs of hairs, the anterior pair much longer and thicker than the posterior one. Dorsum of the mesonotum with 2 pairs of erect hairs, one pair close to the anterior border and the second close to the parapsidal furrows. Petiole with a pair of pointed hairs dorso-laterally. Postpetiole with 2 pairs of pointed hairs, the anterior pair dorso-lateral and longer, the posterior pair dorsal and close to the posterior border. Ventral surface of the postpetiole with a thick hair. Gaster with few erect pointed hairs.

C o l o u r . light brown.

Measurements (in mm) and indices: TL 2.30; HL 0.58; HW 0.30; SL 0.27; ML 0.14; EL 0.14; WL 0.67; CI 51.7; SI 90.0; MI 24.1.

M a t e r i a l e x a m i n e d . The unique *pilosula* example is embedded in a small, cut and polished, yellowish amber sample 0.5 x 0.5 x 1.5 cm containing only this specimen. The amber sample bears the No. H 10-190 in the GOPC. The preservation conditions are good, although the right side of the ant is slightly flattened.

D i s c u s s i o n . *S. pilosula* resembles another previously known Dominican fossil, *S. schleeorum* (compare the figures of the present study with Figs. 22 & 23 by BARONI URBANI & DE ANDRADE, 1994). Both species share a peculiar mandibular shape, with rela-

tively short, curved and pointed mandibles without differentiated apical teeth touching each other only at the apex when closed. This structure is unknown among extant *Strumigenys* and appears to characterize a now extinct Dominican amber clade.

†*Strumigenys poinari* Baroni Urbani & de Andrade n. sp.

Type material: holotype worker in Dominican amber (GOPC No. H 10-220). Paratypes: 4 workers in the same amber piece and collection as the holotype.

Derivatio nominis: this species is named after Dr. George O. Poinar, Jr. who permitted us to study this and many more interesting amber samples.

Diagnosis. A *Strumigenys* belonging to the *rostrata*-group as defined by BOLTON (2000), resembling *carolinensis* (Brown), but differing from it by the presence of 4 suberect hairs on the vertexal margin, by the pronotal humeral hair gently spatulate instead of long and flagellate, and by the hind basitarsi without flagellate hairs.

Worker description (Figs. 61 & 62). Head strongly converging anteriorly and with round vertexal corners. Frontal lobes slightly expanded and convex. Antennal fossae ventrally with a carina visible in full-face view, straight, covering the lower margin of the scrobes and ending before the upper border of the eye. Eyes with about 5 ommatidia in the longest row, placed over the ventral margin of the antennal scrobes. With the head in profile the scrobes are distinct, with the upper and lower margins superficially marked. Lateral clypeal margins gently converging anteriorly into a convex margin. Scapes slightly compressed dorsoventrally, with sub-basal bend gently convex, slightly less than 1/2 of the head length and surpassing the eyes posteriorly. Antennae with six segments. Apical funicular joint longer than the rest of the funiculus. Mandibles short. Internal border of the mandibles with broad and triangular basal lamella followed by 12 teeth or denticles. Tooth 1 (basal) and 2 small, subequal in size, tooth 3 the longest, tooth 4 half size than 3, tooth 5 slightly shorter than 3, teeth 6 and 7 similar to 1 and 2 and followed by 4 denticles and by a small apical tooth.

Mesosoma in profile gently sloping posteriorly. A short longitudinal ruga runs on the dorsum of the pronotum and mesonotum. Propodeal teeth large, triangular and subtended by a broad lamella.

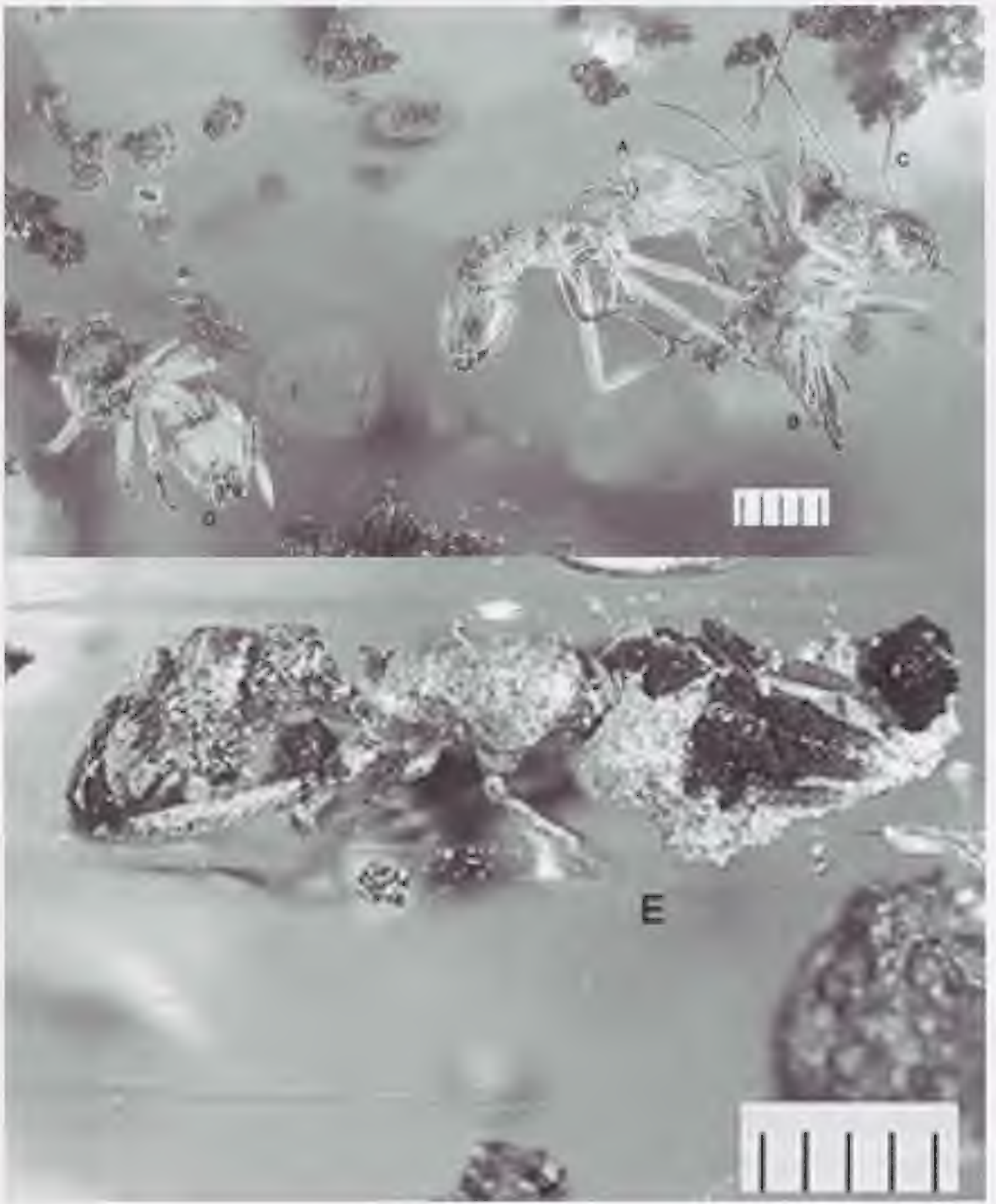


Fig. 61 - *Strumigenys poinari* n. sp., Dominican amber fragment including the holotype (A) and paratypes B-D (top) and paratype E at another location in the same amber fragment (bottom). Distance between two scale bars 0.1 mm.

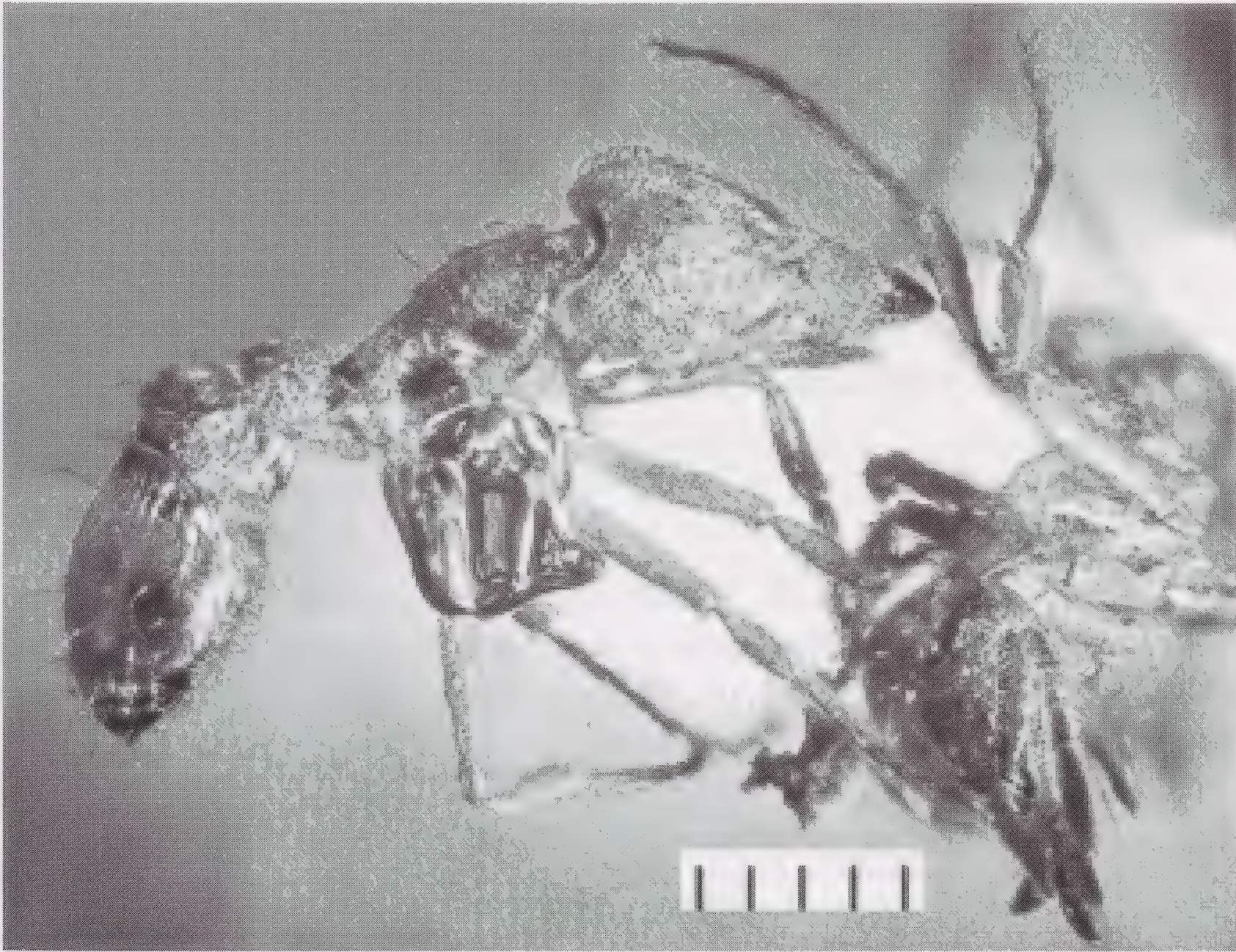


Fig. 62 - *Strumigenys poinari* n. sp. from Dominican amber. Holotype worker in profile. Distance between two scale bars 0.1 mm.

Petiole with node high and convex and with developed spongiform processes. Ventral surface of the petiole with spongiform lamina. Post-petiole convex in profile and with developed spongiform processes.

Gaster oval and with few, short costulae. Base of the first gastral tergite with broad limbus. Base of the first gastral sternite with spongiform pad.

Sculpture. Head, mesosoma and petiole reticulate-punctuate, the reticulation-punctuation larger on the head. In addition the mesonotum with sparse, very thin, longitudinal rugosities, much sparser on the mesonotum and propodeum. Mesopleurae and metapleurae largely smooth and shining. Dorsum of the postpetiole minutely punctuate and superficially shining. Gaster smooth and shining.

Pilosity. Head and mesosoma with subdecumbent or decumbent, spatulate hairs, rarer on the mesosoma. Apicoscrobial hair absent.

Cephalic dorsum with 4 suberect, spatulate hairs close to the vertexal margin. Leading edge of the scapes with spatulate hairs curved basally and apically. Lateral clypeal margins with spatulate hairs curved anteriorly. Pronotal humeral hair short and slightly spatulate. Sides of the mesonotum with 1 erect, curved, thick, flagellate hair. Petiole, postpetiole and first gastral tergite with sparse, curved, thick flagellate hairs. First gastral sternites with suberect spatulate hairs.

C o l o u r . dark brown.

Measurements (in mm) and indices: TL 2.15-2.20; HL 0.58-0.59; HW 0.39-0.40; SL 0.27-0.28; ML 0.13; EL 0.05; WL 0.54-0.56; CI 66.1-69.0; SI 67.5-71.8; MI 22.0-22.4.

M a t e r i a l e x a m i n e d . Holotype and 4 paratype workers, all embedded in the same yellow amber sample 1.6 x 2.1 x 0.7 cm containing 5 workers of *Strumigenys*, a *Diplorhoptrum* worker (gaster and large part of postpetiole and right legs missing), an unidentified small insect and many debris. GOPC H 10-220. The preservation conditions of the *Strumigenys* specimens are good.

D i s c u s s i o n . *S. poinari* resembles *S. carolinensis* in general habitus and mandibular dentition but the two species can be easily separate on the basis of the pilosity (see the diagnosis). *S. carolinensis* is known only from North and South Carolina and from Florida. Clearly Nearctic relationships are an uncommon trait among Dominican amber ants. There are no obvious relationships between *S. poinari* and two other *Strumigenys* previously described from Dominican amber (*S. pilosula* de Andrade, present paper, and *S. schleorum* Baroni Urbani & de Andrade, (BARONI URBANI & ANDRADE, 1994)). On the contrary *S. poinari* and the third known Dominican fossil *Strumigenys*, *S. electrina* de Andrade might belong to a unique small clade. The two species, however, differ from each other in a number of details like presence of apicoscrobal hairs (*electrina* only), larger size of *poinari*, etc.

7. ACKNOWLEDGEMENTS

We are particularly grateful to several persons who facilitated our work in several different ways. Prof Giovanni Onore, Juan Vieira and David Donoso of the Pontificia Universidad Católica of Quito generously offered material and multiple helps during our collecting

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Daniel Mathys and Marcel Düggelein of the Microscopy Laboratory of the Basle University made with their usual know how and patience all the SEM micrographs.

Particularly warm thanks are due to Dr Roberto Poggi for his patience and competence in editing our manuscript.

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FMNH, Mr Philip P. Parrillo.

GOPC, Dr George O. Poinar, Jr.

MHNG, Dr Bernhard Merz.

MIZA, Dr John Lattke.

NHMB, Dr Michel Brancucci and Dr Daniel Burckhardt.

PUCE, Prof Dr Giovanni Onore. Deposited in PUCE are also the ant collections of David Donoso and Juan Manuel Vieira Correa. We are particularly grateful to these two young and enthusiastic myrmecologists for their offer of material for study and for several invaluable helps during our fieldwork in Ecuador.

Moreover, we feel obliged to especially recognize the help received from certain persons in studying material kept in some institutions where we encountered previously unknown difficulties:

BMNH, Prof Dr Quentin Wheeler and Mr Stuart Hime. We addressed our first requests to examine part of the material studied by Mr Bolton to Ms Ryder and to Mr Hime but in vain. It was only after writing to Professor Wheeler that we obtained a reply and the ants from Mr Hime.

MCZC, Mr Stefan P. Cover, who, in order to send us specimens from the Harvard collection, wrestled for over one year with new restrictions from the Museum (e. g. loan of specimens for the sole comparison purpose is now prohibited) and from U. S. federal directives (e.g. technical hitches in sending parcels after the World Trade Center September 11, 2001 attacks; the Museum violating new regulations from the US Department of Fish and Wildlife), and others. Also a mail to Prof E. O. Wilson remained unanswered on this subject. Other U. S. institutions contacted by us at the same time appeared to be not affected by these restrictions.

MZSP, Prof Dr C. R. F. Brandão, who, in spite of his commitments as Director of the Museu de Zoologia in San Paulo, was able to organize the sending of the specimens under his care after six months confrontation with new Brazilian Federal laws imposing unparalleled bureaucratic formalities.

If, on one hand, we can only repeat our gratitude to all those who spent their time in order to permit us to study specimens under their care, on the other we consider the bureaucratic and practical difficulties encountered somewhere as perilous for the free access to scientific information and we wish that the authorities responsible of them may undertake as soon as possible the necessary steps to improve the situation faced by us.

8. REFERENCES

- ANDRADE (DE) M. L. & BARONI URBANI C., 2005 – Collecting and identifying Ecuadorian ants: difficulties with Dacetini – *Notes from Underground*: 11. <http://www.notesfromunderground.org/archive/issue11-1/fieldobs/collectingecuador2.html>.
- ASTRUC C., JULIEN J. F., ERRARD C. AND LENOIR A., 2004 – Phylogeny of ants (Formicidae) based on morphology and DNA sequence data – *Mol. Phylogenet. Evol.*, Oxford, 31: 880-893.
- BARONI URBANI C., 1995 – Invasion and extinction in the West Indian ant fauna revised: the example of *Pheidole* – *Stuttgart. Beitr. Naturkd.*, B, Stuttgart, 222: 1-29.
- BARONI URBANI C., 1998 – *Strumigenys baudueri* (Emery): espèce nouvelle pour la Suisse (Hymenoptera: Formicidae) – *Bull. Soc. ent. suisse*, Zurich, 71: 163-164.
- BARONI URBANI C., 2005 – Phylogeny and biogeography of the ant subfamily Ponomymecinae (Hymenoptera, Formicidae) – *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 96: 581-595.
- BARONI URBANI C. & ANDRADE (DE) M. L., 1994 – First description of fossil Dacetini ants with a critical analysis of the current classification of the tribe – *Stuttgart. Beitr. Naturkd.*, B, Stuttgart, 198: 1-65.
- BARONI URBANI C. & ANDRADE (DE) M. L., 2003 – The ant genus *Proceratium* in the extant and fossil record (Hymenoptera: Formicidae) – *Mus. reg. Sci. nat. Torino, Monogr.*, Torino, 36: 492 pp.
- BARONI URBANI C. & ANDRADE (DE) M. L., 2006a – Correcting our correctors. 1: the "Tribe Phalacromyrmecini" – *Notes from Underground*: 11, 2. <http://www.notesfromunderground.org/opinion/urbani/Phalacromyrmecini.htm>
- BARONI URBANI C. & ANDRADE (DE) M. L., 2006b – Correcting our correctors. 2: the search for the true Dacetini – *Notes from Underground*: 11, 2. <http://www.notesfromunderground.org/opinion/urbani/correctors2.htm>
- BARONI URBANI C., BOLTON B., & WARD P. S., 1992 – The internal phylogeny of ants (Hymenoptera: Formicidae) – *Syst. Ent.*, Oxford, 17: 301-329.

- BOLTON B., 1972 – Two new species of the ant genus *Epitritus* from Ghana, with a key to the world species – *Ent. mont. Mag.*, London, 107: 205-208.
- BOLTON B., 1983 – The Afrotropical dacetine ants (Formicidae) – *Bull. Brit. Mus. (Nat. Hist.)*, *Ent.*, London, 46: 267-416.
- BOLTON B., 1984 – Diagnosis and relationships of the myrmicine ant genus *Ishakidris* gen. n. (Hymenoptera: Formicidae) – *Syst. Ent.*, Oxford, 9: 373-382.
- BOLTON B., 1987 – Review of the *Solenopsis* genus-group and revision of Afrotropical *Monomorium* (Hymenoptera: Formicidae) Mayr – *Bull. Brit. Mus. (Nat. Hist.)*, *Ent.*, London, 54: 263-452.
- BOLTON B., 1994 – Identification guide to the ant genera of the world – Harvard Univ. Press, Cambridge, Mass., 222 pp.
- BOLTON B., 1995 – A new general catalogue of the ants of the world – Harvard Univ. Press, Cambridge, Mass., 504 pp.
- BOLTON B., 1998 – Monophyly of the dacetonine tribe-group and its component tribes (Hymenoptera: Formicidae) – *Bull. nat. Hist. Mus., Lond. (Ent.)*, London, 67: 65-78.
- BOLTON B., 1999 – Ant genera of the tribe Dacetonini (Hymenoptera: Formicidae) – *J. nat. Hist.*, London, 33: 1639-1689.
- BOLTON B., 2000 – The ant tribe Dacetini – *Mem. Amer. ent. Inst.*, Gainesville, 65: 1-1028.
- BOLTON B., 2003 – Synopsis and classification of Formicidae – *Mem. Amer. ent. Inst.*, Gainesville, 71: 1-370.
- BOLTON B., 2006a – Phalacromyrmecini: defending the defensible – *Notes from Underground*: 11, 2. <http://www.notesfromunderground.org/opinion/Boltonresponse/defending.htm>.
- BOLTON B., 2006b – Maintaining the current Dacetini: any need to correct the correctors? – *Notes from Underground*: 11, 2. <http://www.notesfromunderground.org/opinion/boltonresponse/defending2.htm>.
- BORGMEIER T., 1954 – Two interesting dacetine ants from Brazil – *Rev. bras. Biol.*, São Carlos, 14: 279-284.
- BRADY S. G. 2003 – Evolution of the army ant syndrome: the origin and long-term evolutionary stasis of a complex of behavioral and reproductive adaptations – *Proc. natl. Acad. Sci.*, Palo Alto, 100: 6575-6579.
- BRADY, S. G., SCHULTZ T. R., FISHER B. L., & WARD P. S., 2006a – Evaluating alternative hypotheses for the early evolution and diversification of ants – *Proc. natl. Acad. Sci.*, Palo Alto, Early Edition: 1-6.
- BRADY, S. G., SCHULTZ T. R., FISHER B. L., & WARD P. S., 2006b – Supporting online material for “Evaluating alternative hypotheses for the early evolution and diversification of ants” – www.pnas.org/cgi/content/full/0605858103/DC1.
- BROWN W. L., JR., 1948 – A preliminary generic revision of the higher Dacetini (Hymenoptera: Formicidae) – *Trans. Amer. ent. Soc.*, Philadelphia, 74: 101-129.
- BROWN W. L., JR., 1949a – Revision of the ant tribe Dacetini. III. *Epitritus* Emery and *Quadristruma* new genus – *Trans. Amer. ent. Soc.*, Philadelphia, 75: 43-51.
- BROWN W. L., JR., 1949b – Revision of the ant tribe Dacetini. I. Fauna of Japan, China and Taiwan – *Mushi*, Fukuoka, 20: 1-25.

- BROWN W. L., JR., 1949c – Revision of the ant tribe Dacetini. IV. Some genera properly excluded from the Dacetini, with the establishment of the Basicerotini new tribe – *Trans. Amer. ent. Soc.*, Philadelphia, 75: 83-96.
- BROWN W. L., JR., 1950a – Revision of the ant tribe Dacetini. II. *Glamyromyrmex* Wheeler and closely related small genera – *Trans. Amer. ent. Soc.*, Philadelphia, 76: 27-36.
- BROWN W. L., JR., 1950b – Preliminary description of seven new species of the dacetine ant genus *Smithistruma* Brown – *Trans. Amer. ent. Soc.*, Philadelphia, 76: 37-45.
- BROWN W. L., JR., 1952 – The dacetine ant genus *Mesostruma* – *Trans. R. Soc. S. Australia*, Adelaide, 75: 9-13.
- BROWN W. L., JR., 1953 – Revisionary studies in the ant tribe Dacetini – *Amer. Midl. Nat.*, Notre Dame/Indiana, 50: 1-137.
- BROWN W. L., JR., 1959 – Some new species of dacetine ants – *Brev. Mus. comp. Zool.*, Cambridge/Mass., 108: 1-11.
- BROWN W. L., JR., 1960 – The Neotropical species of the ant genus *Strumigenys* Fr. Smith: group of *gundlachi* (Roger) – *Psyche*, Cambridge/Mass., 66: 37-52.
- BROWN W. L., JR., 1962 – A new ant of the genus *Epitritus* from south of the Sahara – *Psyche*, Cambridge/Mass., 69: 77-80.
- BROWN W. L., JR., 1964 – The ant genus *Smithistruma*: a first supplement to the world revision – *Trans. Amer. ent. Soc.*, Philadelphia, 89: 183-200.
- BROWN W. L., JR., 1965a – *Colobostruma papulata* species nov. – *Pilot Reg. Zool.*, Ithaca/New York, Card 21.
- BROWN W. L., JR., 1965b – *Colobostruma nancyae* species nov. – *Pilot Reg. Zool.*, Ithaca/New York, Card 22.
- BROWN W. L., JR., 1969 – *Strumigenys wilsoni* species nov. – *Pilot Reg. Zool.*, Ithaca/New York, Card 28.
- BROWN W. L., JR., 1972 – *Asketogenys acubecca*, a new genus and species of dacetine ants from Malaya – *Psyche*, Cambridge/Mass., 79: 23-26.
- BROWN W. L., JR., 1973a – A new species of *Miccostruma* (Hymenoptera: Formicidae) from West Africa, with notes on the genus – *J. Kansas ent. Soc.*, Manhattan, 46: 32-35.
- BROWN W. L., JR., 1973b – A comparison of the Hylean and Congo–West African rain forest ant faunas (pp. 161–185) – In “Tropical forest ecosystems in Africa and South America, a review” (Eds. B. J. Meggers, E. S. Ayensu, & W. D. Duckworth), Smithsonian Institution Press, Washington, D. C.
- BROWN W. L., JR., 1973c – The Indo–Australian species of the ant genus *Strumigenys*: groups of *horvathi*, *mayri* and *wallacei* – *Pac. Ins.*, Honolulu, 15: 259-269.
- BROWN W. L., JR., 1974 – A supplement to the revision of the ant genus *Basiceros* – *J. New York ent. Soc.*, 82: 131-140.
- BROWN W. L., JR., 1976 – *Cladarogenys* genus nov. – *Pilot Reg. Zool.*, Ithaca/New York, Card 33.
- BROWN W. L., JR., 1978 – An aberrant new genus of myrmicine ant from Madagascar. *Psyche*, Cambridge/Mass., 84 (1977): 218-224.

- BROWN W. L., JR., 1980 – *Protalaridris* genus nov. – *Pilot Reg. Zool.*, Ithaca/New York, Card 36.
- BROWN W. L., JR. & BOISVERT R. G., 1979 – The dacetine ant genus *Pentasturma* – *Psyche*, Cambridge/Mass., 85: 201-207.
- BROWN W. L., JR. & KEMPF W. W., 1960 – A world revision of the ant tribe Basicerotini (Hym. Formicidae) – *Studia ent.*, Petrópolis, 3: 161-250.
- BROWN W. L., JR. & KEMPF W. W., 1961 – The type species of the ant genus *Eurhopalothrix* – *Psyche*, Cambridge/Mass., 67: 44.
- BROWN W. L., JR. & KEMPF W. W., 1968 – *Tatuidris*, a remarkable new genus of Formicidae – *Psyche*, Cambridge/Mass., 74 (1967): 183-190.
- BROWN W. L., JR. & KEMPF W. W., 1969 – A revision of the neotropical dacetine ant genus *Acanthognathus* (Hymenoptera: Formicidae) – *Psyche*, Cambridge/Mass., 76: 86-109.
- BROWN W. L., JR. & WILSON E. O., 1959 – The evolution of the dacetine ants – *Quart. Rev. Biol.*, Stony Brook, 34: 278-294.
- CARPENTER F. M., 1930 – The fossil ants of North America – *Bull. Mus. comp. Zool. Harvard Coll.*, Cambridge/Mass., 70: 1-66, 11 pl.
- CARPENTER F. M., 1935 – A new name for *Lithomyrmex* Carp. – *Psyche*, Cambridge/Mass., 42: 91.
- CLARK J., 1928 – Entomological reports. Formicidae (pp. 39-44). In "Report of the Victorian Field Naturalists' Expedition through the Western District of Victoria in October, 1927" – *Victorian Naturalist*, Blackburn, 45: 1-52.
- CONSANI M., 1951 – Formiche dell'Africa orientale – *Boll. Ist. Ent. Univ. Bologna*, 18: 167-172.
- CREIGHTON W. S., 1950 – *Polyhomoa* Azuma, a synonym of *Kyidris* Brown – *Psyche*, Cambridge/Mass., 57: 93.
- DALLA TORRE C. G. (DE), 1893 – Catalogus Hymenopterorum hucusque descriptorum systematicus et synonymicus. 7: Formicidae (Heterogyna) – viii+1 n. n. + 289 pp. Lipsiae (W. Engelmann).
- DEYRUP M., 1998 – *Smithistruma memorialis*, a new species of ant from the Kentucky Cumberland Plateau – *Ent. News*, Dover, 109: 81-87.
- DEYRUP M., 2006 – *Pyramica boltoni*, a new species of leaf-litter inhabiting ant from Florida (Hymenoptera: Formicidae: Dacetini) – *Florida Ent.*, Gainesville, 89: 1-5.
- DEYRUP M. & COVER S., 1998 – Two new species of *Smithistruma* Brown from Florida – *Proc. Ent. Soc. Washington*, 100: 214-221.
- DEYRUP M., JOHNSON C. & DAVIS L., 1997 – Notes on the ant *Eurhopalothrix floridana*, with a description of the male (Hymenoptera: Formicidae) – *Ent. News*, Dover 108: 183-189.
- DEYRUP M. & LUBERTAZZI D., 2001 – A new species of ant (Hymenoptera: Formicidae) from North Florida – *Ent. News*, Dover, 112: 15.
- DIETZ B. H., 2004 – Uma revisão de Basicerotini Brown, 1948 (Formicidae: Myrmicinae), suas relações filogenéticas internas e com outras tribos dacetíneas (Dacetini e Phalacromyrmecini) – Inst. Biociências Univ. S. Paulo, Tese de Doutorado, São Paulo, 245 pp.
- DINIZ J. L. M., 1990 – Revisão sistemática da tribo Stegomyrmecini, com a descrição de uma nova espécie (Hymenoptera, Formicidae) – *Rev. bras. Entom.*, São Paulo, 34: 277-295.

- DLUSSKY G. M. & FEDOSEEVA E. B., 1988 – Origin and early evolution of the ants (pp.70-144) – In “Cretaceous biocenotic crisis and insect evolution” (Ed. A. G. Ponomarenko), Nauka, Moscow. [in Russian].
- DONISTHORPE H., 1916 – *Epitritus wheeleri*, n. sp., an ant new to science, with notes on the genus *Epitritus* Emery – *Ent. Rec. J. Variation*, London, 28: 121-122.
- DONISTHORPE H., 1948 – A third instalment of the Ross collection of ants from New Guinea – *Ann. Mag. nat. Hist.*, London, 14: 589-604.
- EMERY C., 1869a – Formicidarum italicorum species duae novae – *Bull. Soc. ent. it.*, Firenze, 1: 135-137.
- EMERY C., 1869b – Enumerazione dei Formicidi che rinvenngonsi nei contorni di Napoli – *Ann. Accad. Aspir. Nat.*, Napoli, 2: 1-26.
- EMERY C., 1875 – Le formiche ipogee con descrizione di specie nuove o poco note – *Ann. Mus. civ. St. nat. Genova*, 7: 465-474.
- EMERY C., 1888 – Formiche della provincia di Rio Grande do Sul nel Brasile, raccolte dal dott. Hermann von Ihering – *Bull. Soc. ent. it.*, Firenze, 19: 352-366.
- EMERY C., 1890 – Voyage de M. E. Simon au Venezuela (Décembre 1887–Avril 1888) – *Ann. Soc. ent. Fr.*, Paris, 10: 55-76.
- EMERY C., 1891 – Le formiche dell’ambra siciliana nel Museo Mineralogico dell’Università di Bologna – *Mem. R. Accad. Sci. Ist. Bologna*, Ser., 5, 1: 567–591, pls 1-3.
- EMERY C., 1894 – Studi sulle formiche della fauna neotropica – *Bull. Soc. ent. it.*, Firenze, 26: 137-241.
- EMERY C., 1895a – Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna (Schluss) – *Zool. Jahrb., Abt. Syst., Geogr. Biol. Tiere*, Jena, 8: 257-360.
- EMERY C., 1895b – Voyage de M. E. Simon dans l’Afrique australe (janvier – avril 1893). Formicides – *Ann. Soc. ent. Fr.*, Paris, 64: 15-56.
- EMERY C., 1895c – Die Gattung *Dorylus* Fab. Und die systematische Eintheilung der Formiciden – *Zool. Jahrb., Abt. Syst., Geogr. Biol. Tiere*, Jena, 8: 685-778.
- EMERY C., 1897 – Formicidarum species novae vel minus cognitae in collectione musaei nationalis hungarici, quas in Nova Guinea, colonia germanica, collegit L. Biró *Termész. Füzetek*, Budapest, 20: 571–599, pls 14-15.
- EMERY C., 1906 – Studi sulle formiche della fauna Neotropica – *Bull. Soc. ent. it.*, Firenze, 37: 107-194.
- EMERY C., 1914 – Intorno alla classificazione dei Myrmicinae – *Rend. Sess. R. Accad. Sci. Ist. Bologna*, 18: 29-42.
- EMERY C., 1915 – Contributo alla conoscenza delle formiche delle isole italiane. Descrizioni di forme mediterranee nuove o critiche – *Ann. Mus. civ. St. nat. G. Doria*, Genova, 46 (=Ser. 3, 6): 244-270.
- EMERY C., 1924 – Hymenoptera. Fam. Formicidae. Subfam. Myrmicinae – *Genera Insectorum*, Bruxelles, 174C: 207-397.
- EMERY C., 1925 – Hymenoptera. Fam. Formicidae. Subfam. Formicinae – *Genera Insectorum*, Bruxelles, 183: 1-302.
- FOREL A., 1886 – Einige Ameisen aus Itajahy (Brasilien) – *Mitt. schweiz. ent. Ges.*, Zurich, 7: 210–217.

- FOREL A., 1892 – Attini und Cryptocerini. Zwei neue *Apterostigma*-Arten – *Mitt. schweiz. ent. Ges.*, Zurich, 8: 344-349.
- FOREL A., 1893a – Sur la classification de la famille des formicides, avec remarques synonymiques – *Ann. Soc. ent. Belg.*, Bruxelles, 37: 161-167.
- FOREL A., 1893b – Formicides de l'Antille St. Vincent. Récoltées par Mons. H. H. Smith – *Trans. ent. Soc. London*, 1893: 333-418.
- FOREL A., 1895 – Nouvelles fourmis d'Australie, récoltées à The Ridge, Mackay, Queensland par M. Gilbert Tournier – *Ann. Soc. ent. Belg.*, Bruxelles, 39: 417-428.
- FOREL A., 1901 – Variétés myrmécologiques – *Ann. Soc. ent. Belg.*, Bruxelles, 45: 334-382.
- FOREL A., 1904 – Note sur les fourmis du Musée Zoologique de l'Académie Impériale des Sciences à St. Pétersbourg – *Ann. Mus. Zool. Acad. imp. Sci. St. Pétersbourg*, 8: 368-388.
- FOREL A., 1907 – Formicides du Musée National Hongrois – *Ann. hist.-nat. Mus. natl. hung.*, Budapest, 5: 1-42.
- FOREL A., 1912a – H. Sauter's Formosa-Ausbeute: Formicidae – *Ent. Mitt.*, Berlin/Dahlem, 1: 45-81.
- FOREL A., 1912b – Formicides Néotropiques. Part. II. 3^{me} sous-famille Myrmicinae Lep. (Attini, Dacetii, Cryptocerini) – *Mém. Soc. ent. Belg.*, Bruxelles, 19: 179-209.
- FOREL A., 1913 – Fourmis de Tasmanie et d'Australie récoltées par MM. Lea, Froggatt, etc. – *Bull. Soc. vaud. Sci. nat.*, Lausanne, 49: 173-195.
- FOREL A., 1916 – Fourmis du Congo et d'autres provenances récoltées par MM. Hermann Kohl, Luja, Mayné, etc. – *Rev. suisse Zool.*, Genève, 24: 397-460.
- HENNIG W., 1950. – Grundzüge einer Theorie der phylogenetischen Systematik – Deutscher Zentralverlag, Berlin, 370 pp.
- ITO T., 1914 – Formicidarum Japonicum species novae vel minus cognitae – *Ann. Soc. ent. Belg.*, Bruxelles, 58: 40-45.
- KEMPF W. W., 1958 – Three new ants of the genus *Strumigenys* from Colombia – *Rev. bras. Entom.*, São Paulo, 8: 59-68.
- KEMPF W. W., 1959 – Two new species of *Gymnomyrmex* Borgmeier, 1954, from southern Brazil, with remarks on the genus – *Rev. bras. Biol.*, São Carlos, 19: 337-344.
- KEMPF W. W., 1960a – *Phalacromyrmex*, a new ant genus from southern Brazil – *Rev. bras. Biol.*, São Carlos, 20: 89-92.
- KEMPF W. W., 1960b – Miscellaneous studies on Neotropical ants – *Studia ent.*, Petrópolis, 3: 417-466.
- KEMPF W. W., 1962 – Miscellaneous studies on Neotropical ants. 2. – *Studia ent.*, Petrópolis, 5: 2-38.
- KEMPF W. W., 1964 – Miscellaneous studies on Neotropical ants. 3 – *Studia ent.*, Petrópolis, 7: 45-71.
- KEMPF W. W., 1967 – Three new South American ants – *Studia ent.*, Petrópolis, 10: 353-360.
- KEMPF W. W., 1969 – Miscellaneous studies on Neotropical ants. 5 – *Studia ent.*, Petrópolis, 12: 273-296.

- KEMPF W. W., 1975 – Report on Neotropical dacetine ant studies – *Rev. bras. Biol.*, São Carlos, 34: 411-424.
- KENNEDY C. H. & SCHRAMM M. M., 1933 – A new *Strumigenys* with notes on Ohio species – *Ann. ent. Soc. America*, Lanham, 26: 95-104.
- KETTERL J. VERHAAGH M. & DIETZ B. H., 2004 – *Eurhopalothrix depressa* sp. n. (Hymenoptera: Formicidae) from Southern Brazil with a key to the Neotropical taxa of the genus – *Stud. neotrop. Fauna Env.*, London, 39: 45-48.
- LACORDAIRE T., 1848 – Monographie des coléoptères subpentamères de la famille des Phytophages – *Mém. Soc. R. Sci. Liège*, 5: 1-890.
- LATTKE J. E., 1992 – *Trichoscapa inusitata*, a remarkable dacetine ant from the Orinoco Watershed – *Trop. Zool.*, Firenze, 5: 141-144.
- LATTKE J. E. & GOITÍA W., 1997 – El género *Strumigenys* en Venezuela – *Caldasia*, Bogotá, 19: 367-396.
- LONGINO J. T., 2006 – New species and nomenclatural changes for the Costa Rican ant fauna (Hymenoptera: Formicidae) – *Myrm. Nachr.*, Wien, 8: 131-143.
- MADDISON W. P. & MADDISON D. R., 2002 – MacClade: analysis of phylogeny and character evolution, version 4.05 – Sinauer Associates, Sunderland, Mass.
- MANN W. M., 1919 – The ants of the British Solomon Islands – *Bull. Mus. comp. Zool. Harvard Coll.*, Cambridge/Mass., 63: 273-391.
- MANN W. M., 1922 – Ants from Honduras and Guatemala – *Proc. U. S. nat. Mus.*, Washington/D.C., 61: 1-54.
- MANN W. M., 1926 – Some new Neotropical ants – *Psyche*, Cambridge/Mass., 33: 97-107.
- MAYR G. L., 1866 – Myrmekologische Beiträge – *Sitzungsber. k. Akad. Wiss. Wien, mat. naturwiss. Cl.*, 53: 484-517.
- MAYR G. L., 1870 – Formicidae novogranadenses – *Sitzungsber. k. Akad. Wiss. Wien, mat. naturwiss. Cl.*, 61: 360-417.
- MAYR G. L., 1887 – Südamerikanische Formiciden – *Verh. k. k. zool.-bot. Ges. Wien*, 37: 511-632.
- MAYR G. L., 1901 – Südafrikanische Formiciden, gesammelt von Dr. Hans Brauns – *Ann. k. naturh. Hofmus. Wien*, 16: 1-30.
- MENOZZI C., 1939 – Qualche nuova formica di Sumatra – *Tijdschr. Ent.*, Amsterdam, 82: 175-181.
- MOREAU C. S., BELL C. D., VILA R., ARCHIBALD S. B. & PIERCE N. E., 2006a – Phylogeny of the ants: diversification in the age of angiosperms – *Science*, Washington/D.C., 312: 101-104.
- MOREAU C. S., BELL C. D., VILA R., ARCHIBALD S. B. & PIERCE N. E., 2006b – Supporting online material for “Phylogeny of the ants: diversification in the age of angiosperms” – www.sciencemag.org/cgi/content/full/312/5770/101/DC1
- OGATA K., 1990 – A new species of the ant genus *Epitritus* Emery from Japan – *Esakia*, Kyushu, Special Issue, 1: 197-199.
- OGATA K. & ONOYAMA K., 1998 – A revision of the ant genus *Smithistruma* Brown of Japan, with descriptions of four new species – *Ent. Sci.*, Oxford, 1: 277-287.
- OHNISHI H., IMAI H. T. & YAMAMOTO M.-T., 2003 – Molecular phylogenetic analysis of ant subfamily relationship inferred from rDNA sequences – *Genes & Genetic Systems*, Tokyo, 78: 419-425

- PALACIO E., 1997 – Hormigas de Colombia VI. Dos nuevas especies de *Octostruma* (Hymenoptera: Formicidae: Basicerotini) – *Caldasia*, Bogotá, 19: 409-418.
- PATRIZI S., 1946 – Contribuzioni alla conoscenza delle formiche e dei mirmecofili dell'Africa orientale – *Boll. Ist. Ent. Univ. Bologna*, 16: 292-296.
- PERRAULT G. H., 1986 – *Gymnomyrmex villiersi*, nouvelle espèce de Guyane – *Rev. fr. Ent.*, Paris, N.S., 8: 1-4.
- PERRAULT G. H., 1988 – *Octostruma betschi*, n. sp. de Guyane Française [Hymenoptera, Formicidae] – *Rev. fr. Ent.*, Paris, N.S., 10: 303-307.
- PERTY M., 1833 – Delectus animalium articulorum, quae in itinere per Brasiliam annis MDCCCXVII–MDCCCXX jussu et auspiciis Maximiliani Josephi I Bavariae Regis augustissimi peracto, collegerunt Dr. J. B. de Spix et Dr. C. F. Ph. De Martius – Fasc. 3, 125–224, Munich (published by the author).
- PFITZER D. W., 1951 – A new species of *Smithistruma* from Tennessee – *J. Tennessee Acad. Sci.*, Farmington Hills, 26: 198-200.
- RAIGNIER A. & VAN BOVEN J., 1955 – Étude taxonomique, biologique et biométrique des *Dorylus* du sous-genre *Anomma* (Hymenoptera Formicidae) – *Ann. Mus. R. Congo Belge, N. S., Sci. Zool.*, Tervuren, 2: 1-359.
- ROGER J., 1862 – Einige neue exotische Ameisen-Gattungen und Arten – *Berl. ent. Zeitschr.*, Berlin, 6: 233-254.
- ROGER J., 1863a – Die neuaufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses, nebst Ergänzung einiger früher gegeben Beschreibungen – *Berl. ent. Zeitschr.*, Berlin, 67: 131-214.
- ROGER J., 1863b – Verzeichniss der Formiciden-Gattungen und Arten – *Berl. ent. Zeitschr.*, Berlin, 67 (Beilage): 1-65.
- SANTSCHI F., 1910 – Formicides nouveaux ou peu connus du Congo Français – *Ann. Soc. ent. France*, Paris, 78: 349-400.
- SANTSCHI F., 1913a – Clé analytique des fourmis africaines du genre *Strumigenys* Sm. – *Bull. Soc. ent. France*, Paris, 1913: 257-259.
- SANTSCHI F., 1913b – Genre nouveau et espèce nouvelle de formicides – *Bull. Soc. ent. France*, Paris, 1913: 478.
- SANTSCHI F., 1914a – Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911–1912). Résultats scientifiques. Insectes Hyménoptères 2. Formicidae, 41-148. Paris.
- SANTSCHI F., 1914b – Formicides de l'Afrique occidentale et australe du voyage de Mr. Le Professeur F. Silvestri – *Boll. Lab. Zool. gen. agr. R. Scuola sup. Agric. Portici*, 8: 309-385.
- SANTSCHI F., 1922 – Description de nouvelles fourmis de l'Argentine et pays limitrophes – *An. Soc. cient. Argentina*, Buenos Aires, 94: 241-262.
- SANTSCHI F., 1923 – Description de nouveaux formicides éthiopiens et notes diverses. 1 – *Rev. Zool. afric.*, Tervuren, 11: 259-295.
- SANTSCHI F., 1931 – Fourmis de Cuba et de Panama – *Rev. Ent.*, Rio de Janeiro, 1: 265-282.
- SANTSCHI F., 1932 – Quelques fourmis inédites de l'Amérique centrale et Cuba – *Rev. Ent.*, Rio de Janeiro, 2: 410-414.
- SAUX C., FISHER B. L. & SPICER G. S., 2004 – Dracula ant phylogeny as inferred by nuclear 28S rDNA sequences and implications for ant systematics (Hymenoptera: Formicidae: Amblyoponinae) – *Mol. phylogenet. Evol.*, Oxford, 33: 457-468.

- SCHULZ W. A., 1906 – *Spolia Hymenopterologica* – Jungfermannsche Buchhandlung, Paderborn, 355 pp.
- SHATTUCK S. O., 2000 – The epopostrumiform genus group (pp. 30–67) – In “The ant tribe Dacetini” (Ed. B. Bolton) – *Mem. Amer. ent. Inst.*, Gainesville, 65: 1–1028.
- SIGNORET V., 1847 – Description de deux hémiptères–homoptères, tribu des octicelles, groupe des cicadides – *Ann. Soc. ent. France*, Paris, 5: 293–296.
- SMITH F., 1853 – Monograph of the genus *Cryptocerus*, belonging to the group Cryptoceridae – Family Myrmicidae – Division Hymenoptera Heterogyna – *Trans. ent. Soc. London*, 2: 213–228.
- SMITH F., 1860 – Descriptions of new genera and species of exotic Hymenoptera – *J. Ent.*, London, 1: 65–84.
- SMITH F., 1865 – Descriptions of new species of hymenopterous insects from the Islands of Sumatra, Sula, Gilolo, Salwatty, and New Guinea, collected by Mr. A. R. Wallace – *J. Proc. Linnean Soc., Zool.*, London, 8: 61–94.
- SMITH M. R., 1931 – A revision of the genus *Strumigenys* of America, north of Mexico, based on a study of the workers – *Ann. ent. Soc. America*, Lanham, 24: 686–706.
- SMITH M. R., 1935 – Two new species of North American *Strumigenys* – *Ann. ent. Soc. America*, Lanham, 28: 214–216.
- SMITH M. R., 1944 – A second species of *Glamyromyrmex* Wheeler – *Proc. ent. Soc. Washington*, 46: 254–256.
- SMITH M. R., 1951 – Formicidae (pp. 778–875). In “Hymenoptera of America North of Mexico. Synoptic catalog” (Eds. C. F. W. Muesebeck, K. V. Krombein & H. K. Townes), United States Department of Agriculture, Agriculture Monograph 2, Washington/D.C., 1420 pp.
- SNELLING R. R., 1968 – A new species of *Eurhopalothrix* from El Salvador – *Contr. Sci.*, Los Angeles, 154: 1–4.
- STÄRCKE A., 1941 – Hersenganglion van *Strumigenys*; koloniestichting van *Polyrhachis bicolor* – *Tijdschr. Ent.*, Amsterdam, 84: ii–xv.
- SWOFFORD D. L., 2000 – PAUP*. Phylogenetic Analysis Using Parsimony (*and Other Methods). Version 4 – Sinauer Associates, Sunderland, Mass.
- SZABÓ J., 1909 – De duabus speciebus novis formicidarum generis *Epitritus* Emery – *Arch. Zool.*, Budapest, 1: 27–28.
- SZABÓ J., 1910 – Formicides nouveaux ou peu connus des collections du Musée National Hongrois – *Ann. hist.–nat. Mus. nat. hung.*, Budapest, 8: 364–369.
- TAYLOR R. W., 1962 – New Australian dacetine ants of the genera *Mesostruma* Brown and *Codiomyrmex* Wheeler (Hymenoptera – Formicidae) – *Breviora*, Cambridge/Mass., 152: 1–10.
- TAYLOR R. W., 1966 – A second African species of the dacetine ant genus *Codiomyrmex* – *Psyche*, Cambridge/Mass., 72 (1965): 225–228.
- TAYLOR R. W., 1968a – Notes on the Indo–Australian basicerotine ants – *Australian J. Zool.*, Melbourne, 16: 333–348.
- TAYLOR R. W., 1968b – A new Malayan species of the ant genus *Epitritus*, and a related new genus from Singapore – *J. Australian ent. Soc.*, Brisbane, 7: 130–134.

- TAYLOR R. W., 1970 – Notes on some Australian and Melanesian basicerotine ants – *J. Australian ent. Soc.*, Brisbane, 9: 49-52.
- TAYLOR R. W., 1973 – Ants of the Australian genus *Mesostruma* (Hymenoptera: Formicidae) – *J. Australian ent. Soc.*, Brisbane, 12: 24-38.
- TAYLOR R. W., 1980a – New Australian ants of the genus *Orectognathus*, with a summary description of the twenty-nine known species – *Australian J. Zool.*, Melbourne, 27: 773-788.
- TAYLOR R. W., 1980b – Australian and Melanesian ants of the genus *Eurhopalothrix* Brown and Kempf – notes and new species – *J. Australian ent. Soc.*, Brisbane, 19: 229-239.
- TAYLOR R. W., 1990 – New Asian ants of the tribe Basicerotini, with an on-line computer interactive key to the twenty-six known Indo-Australian species (Hymenoptera: Formicidae: Myrmicinae) – *Invert. Taxonomy*, Collingwood, 4: 397-425.
- TAYLOR R. W. & BROWN W. L., JR., 1978 – *Smithistruma kempfi* species nov – *Pilot Reg. Zool.*, Ithaca/New York, Card 35.
- TAYLOR R. W. & BROWN W. L., JR., 1985 – Formicoidea (pp. 1-149). In "Zoological catalogue of Australia 2 Hymenoptera: Formicoidea, Vespoidea and Sphecoidea" (Ed. D. W. Walton), Australian Government Publishing Service, Canberra.
- TERAYAMA M. & KUBOTA S., 1989 – The ant tribe Dacetini of Taiwan, with descriptions of three new species – *Japan. J. Ent.*, Tokyo, 57: 778-792.
- TERAYAMA M., LIN C.-C. & WU W.-J., 1995 – The ant genera *Epitritus* and *Kyidris* from Taiwan – *Proc. japan. Soc. Syst. Zool.*, Kyushu, 53: 85-89.
- TERAYAMA M., LIN C.-C. & WU W.-J., 1996 – The Taiwanese species of the ant genus *Smithistruma* – *Japan. J. Ent.*, Tokyo, 64: 327-339.
- WARD P. S., 1988 – Mesic elements in the western Nearctic ant fauna: taxonomic and biological notes on *Amblyopone*, *Proceratium* and *Smithistruma* – *J. Kansas ent. Soc.*, Manhattan, 61: 102-124.
- WARD P. S., 2005 – Review of: Bolton, B. 2003. Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute* 71: 1-370. Notes from Underground, 23. <http://www.notesfromunderground.org/issue11-1/reviews/boltonreviewward%20.html>
- WARD P. S., BRADY S. G., FISHER B. L. & SCHULZ T. R., 2005 – Assembling the ant "Tree of Life" (Hymenoptera: Formicidae) – *Myrm. Nachr.*, Wien, 7: 87-90.
- WASMANN E., 1901-1902 – Neues über die zusammengesetzten Nester und gemischten Kolonien der Ameisen – *Allg. Zeitschr. Ent.*, Berlin, 6 (1901): 353-366, 369-372; 7 (1902): 1-5, 33-37, 72-77, 100-108, 136-139, 167-173, 206-208, 235-240, 260-265, 293-298, 340-345, 385-390, 422-427, 441-449, 1 pl.
- WEBER N. A., 1934 – Notes on the Neotropical ants, including the descriptions of new forms – *Rev. Ent.*, Rio de Janeiro, 5: 22-59.
- WEBER N. A., 1941 – Four new genera of Ethiopian and Neotropical Formicidae – *Ann. ent. Soc. America*, Lanham/MD, 34: 183-194.
- WEBER N. A., 1950 – New Trinidad myrmicinae, with a note on *Basiceros* Schulz – *Amer. Mus. Novitates*, New York, 1465: 1-6.
- WESSON L. G. & WESSON R. G., 1939 – Notes on *Strumigenys* from southern Ohio, with descriptions of six new species – *Psyche*, Cambridge/Mass., 46: 91-112.
- WHEELER G. C. & WHEELER J., 1976 – Ant larvae: review and synthesis – *Mem. ent. Soc. Washington*, 7: 1-180.

- WHEELER G. C. & WHEELER J., 1985 – A simplified conspectus of the Formicidae - *Trans. Amer. ent. Soc.*, Philadelphia, 111: 255-264.
- WHEELER W. M., 1910 – Three new genera of myrmecine ants from tropical America – *Bull. Amer. Mus. nat. Hist.*, New York, 28: 259-265.
- WHEELER W. M., 1911a – Additions to the ant fauna of Jamaica – *Bull. Amer. Mus. nat. Hist.*, New York, 30: 21-29.
- WHEELER W. M., 1911b – A list of the type species of the genera and subgenera of Formicidae – *Ann. New York Acad. Sci.*, 21: 157-175.
- WHEELER W. M., 1913 – Corrections and additions to “List of the type species of the genera and subgenera of Formicidae” – *Ann. New York Acad. Sci.*, 23: 77-83.
- WHEELER W. M., 1915a – The ants of the Baltic amber – *Schrift. phys.-ökon. Ges. Königsberg Pr.*, Leipzig & Berlin, 55 (1914): 1-142.
- WHEELER, W. M., 1915b - Two new genera of myrmicine ants from Brazil - *Bull. Mus. comp. Zool. Harvard Coll.*, Cambridge/Mass., 59: 483-491.
- WHEELER W. M., 1916 – Ants collected in Trinidad by Professor Roland Thaxter, Mr. F. W. Urich, and others – *Bull. Mus. Comp. Zool. Harvard Coll.*, Cambridge/Mass., 60: 323-330.
- WHEELER W. M., 1922 – The ants of the Belgian Congo – *Bull. Amer. Mus. nat. Hist.*, New York, 45: 1-1139.
- WHEELER W. M., 1927 – The physiognomy of insects – *Quart. Rev. Biol.*, Stonybrook/ N.Y., 2: 1-36.
- WHEELER W. M., 1929 – Ants collected by Professor F. Silvestri in Formosa, the Malay Peninsula and the Philippines – *Boll. Lab. Zool. gen. agr. R. Ist. Sup. Agric. Portici*, 24: 27-64.
- WHEELER W. M., 1932 – Ants of the Marquesas Islands – *Pac. Ent. Survey Publ.*, Honolulu, 1: 155-163.
- WILEY E. O., 1981 – Phylogenetics: the theory and practice of phylogenetic systematics. John Wiley & Sons, Ltd., London, 456 pp.
- WILSON E. O. & BROWN W. L., Jr., 1956 – New parasitic ants of the genus *Kyidris*, with notes on ecology and behavior – *Ins. soc.*, Basel, 3: 439-454.
- WILSON E. O. & BROWN W. L., Jr., 1985 – Behavior of the cryptobiotic predaceous ant *Eurhopalothrix heliscata* n. sp. – *Ins. soc.*, Basel, 31: 408-428.
- XU Z., 2000 – A new species of the ant genus *Epitritus* Emery (Hymenoptera: Formicidae) from China – *Entomotaxonomia*, Wugong, 22: 297-300.
- XU Z. & ZHOU S., 2004 – Systematic study on the ant genus *Pyramica* Roger (Hymenoptera, Formicidae) of China – *Acta zootaxonom. sinica*, Beijing, 29: 440-450.

9. ABSTRACT

The authors perform a critical analysis of potentially related genera currently included or excluded from the tribe Dacetini and of the characters used to justify inclusions or exclusions in these and other, related family—group taxa.

A major methodological difference between the present study and the analysis of BOLTON (1999) will explain the diversity of results. For the present study a trait is

recorded as present, absent, or polymorphic in a given taxon according to its observed presence or absence. BOLTON (1999) analysis does not consider known presences or absences when he thinks that these are due to homoplasy. This favours subjective judgment and, in this way, it might allow construction and defence of countless hypothetical clades including species without the synapomorphies characteristic of the clade since these relevant characters may be supposed to have been secondarily lost.

Among the results of the morphological analysis, the so called "mesopleural gland" supposed to be characteristic of the Dacetini is described as constituted by differently developed brushes of hair beds (sensilla trichoidea) widespread among several ant genera and unrelated to visible glandular structures.

A cladistically constructed phylogeny of the genera examined is supported by few undoubted synapomorphies and is considered mainly as a decisional criterion to build a classification based on unequivocal characters only, a condition entirely missing in the current classification.

The following changes result as a consequence of this analysis and of the principle that at least one unequivocal apomorphy must characterize a taxon:

The subfamily Agroecomymecinae is a junior synonym of Myrmicinae. Its downgraded status as a separate tribe, Agroecomymecini, sister tribe of Dacetini within the Myrmicinae, is maintained provisionally to preserve nomenclatorial continuity. As a matter of fact the Dacetini alone appear much more ill defined than a broader tribe including Agroecomymecini+Dacetini.

The tribal names Basicerotini and Phalacromymecini are considered as synonyms of Dacetini.

A number of genera already considered as synonyms of *Strumigenys* by BARONI URBANI & DE ANDRADE (1994), emended by BOLTON (1995), and considered again as synonyms of a single emended name by BOLTON (1999) are re-established as *Strumigenys*' synonyms. These are: *Pyramica*, *Epitritus*, *Trichoscapa*, *Cephaloxys*, *Pentastroma*, *Glamyromymex*, *Codiomymex*, *Tingimymex*, *Codioxenus*, *Smithistruma*, *Weberistruma*, *Wessonistruma*, *Serrastruma*, *Neostruma*, *Dorisidris*, *Miccostruma*, *Kyidris*, *Polyhomoa*, *Chelystruma*, *Borgmeierita*, *Platystruma*, *Gymnomymex*, *Dysedrognathus*, *Asketogenys*, *Cladarogenys*. The following genera are new synonyms of *Epopostruma*: *Colobostruma*, *Alistruma*, *Clarkistruma*, *Mesostruma*. The following genera are new synonyms of *Basiceros*: *Rhopalothrix*, *Heptastruma*, *Acanthidris*, *Octostruma*, *Talaridris*, *Eurhopalothrix*, *Protalaridris*.

The following species are described as new: *Basiceros onorei* from Ecuador, *B. papuanum* from Papua New Guinea, *Strumigenys veddha* from Sri Lanka, *S. aduncomala* from India, *S. caniophanoides* from Bhutan, *S. hindu* from Nepal, *S. buddhista* from Nepal, *S. nageli* from Ecuador, *S. onorei* from Ecuador, *S. longimala* from Ecuador, *S. aequinoctialis* from Ecuador, *S. pilosula* from Dominican amber (Miocene), *S. poinari* from Dominican amber (Miocene).

10. RIASSUNTO

La tribù dei Dacetini: limiti e generi che la compongono, con descrizioni di specie nuove (Hymenoptera, Formicidae).

Si analizzano criticamente alcuni generi attualmente inclusi od esclusi dalla tribù dei Dacetini ed i caratteri impiegati per giustificare le rispettive inclusioni od esclusioni in questo ed altri prossimi taxa di livello sopragenerico.

Una cospicua differenza metodologica tra questo studio e quello di BOLTON (1999) spiega largamente la diversità dei risultati. In questo studio ciascun carattere è stato considerato presente, assente o polimorfico in un taxon a seconda delle presenze ed assenze realmente osservate. BOLTON (1999), al contrario, non tiene cura delle presenze ed assenze da lui ritenute a priori risultato di convergenza o di perdita secondaria. Questo modo di vedere favorisce la valutazione soggettiva e, di conseguenza, permette la creazione e la difesa d'innunerevoli taxa comprendenti specie in cui le apomorfie del taxon in questione sono assenti perché quest'ultime potrebbero essere state perdute secondariamente.

Tra i risultati delle osservazioni morfologiche è da notare che la cosiddetta "ghiandola mesopleurale", correntemente considerata caratteristica di molti Dacetini, viene descritta come costituita da gruppi di sensilli tricoidei presenti in molte formiche disperate e dissociati da strutture ghiandolari visibili.

Un'analisi di parsimonia dei dati morfologici permette la costruzione di un cladogramma dei generi studiati, cladogramma giustificato da poche sinapomorfie indiscutibili e proposto essenzialmente come criterio decisionale per costruire una classificazione del gruppo non equivoca, una caratteristica del tutto assente nella classificazione corrente.

Le seguenti modifiche classificatorie e nomenclatoriali conseguono direttamente dall'analisi del cladogramma e dall'applicazione del principio per cui un taxon deve essere caratterizzato da almeno un'apomorfia inequivocabile.

La sottofamiglia Agroecomymecinae è un sinonimo juniore di Myrmicinae. Il suo stato subordinato di tribù gemella dei Dacetini all'interno dei Myrmicinae viene mantenuto provvisoriamente per conservare una certa continuità nomenclatoriale. I Dacetini da soli, infatti, appaiono molto più superficialmente caratterizzati di una tribù più ampia comprendente gli attuali Dacetini + Agroecomymecini.

Le tribù Basicerotini e Phalacromymecini vengono considerate sinonimi dei Dacetini. Numerosi generi già considerati sinonimi di *Strumigenys* da BARONI URBANI & DE ANDRADE (1994) e resuscitati da BOLTON (1995) e poi considerati sinonimi di un altro genere resuscitato da BOLTON (1999) sono riproposti come sinonimi di *Strumigenys*. Questi sono: *Pyramica*, *Epitritus*, *Trichoscapa*, *Cephaloxys*, *Pentastroma*, *Glamyromymex*, *Codiomyrmex*, *Tingimymex*, *Codioxenus*, *Smithistruma*, *Weberistruma*, *Wessonistruma*, *Serrastruma*, *Neostruma*, *Dorisidris*, *Miccostruma*, *Kyidris*, *Polyhomoa*, *Chelystruma*, *Borgmeierita*, *Platystruma*, *Gymnomymex*, *Dysedrognathus*, *Asketogenys*, *Cladarogenys*. I generi seguenti sono nuovi sinonimi di *Epopostruma*: *Colobostruma*, *Alistruma*, *Clarkistruma*, *Mesostruma*. I generi seguenti sono nuovi sinonimi di *Basiceros*: *Rhopalothrix*, *Heptastruma*, *Acanthidris*, *Octostruma*, *Talaridris*, *Eurhopalothrix*, *Protalaridris*.

Le specie seguenti, studiate per la presente revisione, vengono descritte come nuove: *Basiceros onorei* dell'Ecuador, *B. papuanum* di Papua Nuova Guinea, *Strumigenys veddha* dello Sri Lanka, *S. aduncomala* dell'India, *S. caniophanoides* del Bhutan, *S. hindu* del Nepal, *S. buddhista* del Nepal, *S. nageli* dell'Ecuador, *S. onorei* dell'Ecuador, *S. longimala* dell'Ecuador, *S. aequinoctialis* dell'Ecuador, *S. pilosula* dell'ambra dominicana (Miocene), *S. poinari* dell'ambra dominicana (Miocene).

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TARUN K. PAL*

ON A COLLECTION OF HETEROMERA AND CUCUJOIDEA
OF THE MUSEO CIVICO DI STORIA NATURALE
"G. DORIA", GENOVA
(COLEOPTERA, POLYPHAGA)

INTRODUCTION

I received a collection of undetermined beetles from the Museo Civico di Storia Naturale "G. Doria", Genova which had been collected in continental and insular Africa, South and Southeast Asia, Pacific Islands etc. more than one century ago.

Several species of Heteromera and Cucujoidea were amongst this material, including two new species of *Inopeplus* Smith and one new species for each of the genera *Indoleptipsius* Pal, *Aphanocephalus* Wollaston, *Parafallia* Arrow, *Paramaschema* Heller, *Cephalophanus* John and *Euxestus* Wollaston.

The inventory of the material and descriptions of the eight new species are presented in this work. The material examined is now housed in the following institutions:

MSNG - Museo Civico di Storia Naturale "G. Doria", Genova;
ZSI - Zoological Survey of India, Kolkata.

SYSTEMATIC ACCOUNT

Order COLEOPTERA
Suborder POLYPHAGA
Superfamily HETEROMERA

* Zoological Survey of India, M-Block, New Alipore, Kolkata- 700 053, India.
E-mail: tkpal51@rediffmail.com

Family OTHNIIDAE

Genus *Ocholissa* Pascoe*Ocholissa laticeps* Grouvelle

Ocholissa laticeps Grouvelle, 1908, *Annls. Soc. ent. Fr.*, 77: 410.

Material: Birmania, Bhamò, X.1886, L. Fea, 1 ex. (MSNG); Tenasserim, Thagatà, IV.1887, L. Fea, 1 ex. (MSNG); Giava, Tci-bodas, X.1874, O. Beccari, 1 ex. (ZSI).

Size: length 3.05-3.08 mm.

Distribution: India (Karnatak); Myanmar (new record); Indonesia (new record).

Family INOPEPLIDAE

Genus *Inopeplus* Smith*Inopeplus biocellatus* (Motschulsky)

Euryplatys biocellatus Motschulsky, 1859, *Etud. ent.*, 8: 98.

Inopeplus biocellatus: Grouvelle, 1908, *Annls. Soc. ent. Fr.*, 77: 462; Sengupta, Pal & Mukhopadhyay, 1977, *Orient. Ins.*, 11: 399.

Material: Mentawai, Sipora, Sereinu, V-VI.1894, E. Modigliani, 1 ex. (MSNG); Mentawai, Si Oban, IV-VIII.1894, E. Modigliani, 1 ex. (ZSI).

Size: length 3.80-4.50 mm.

Distribution: India (Arunachal Pradesh, Meghalaya, West Bengal); Indonesia: Java (new record).

Inopeplus pacificus n. sp.

General appearance (Fig. 1) elongated, flattened, shiny, blackish, elytra with pale orbicular spot, last four abdominal segments (occasionally three) exposed, mouthparts partially exposed.

Head broader than long, apical margin truncate, fronto-clypeal

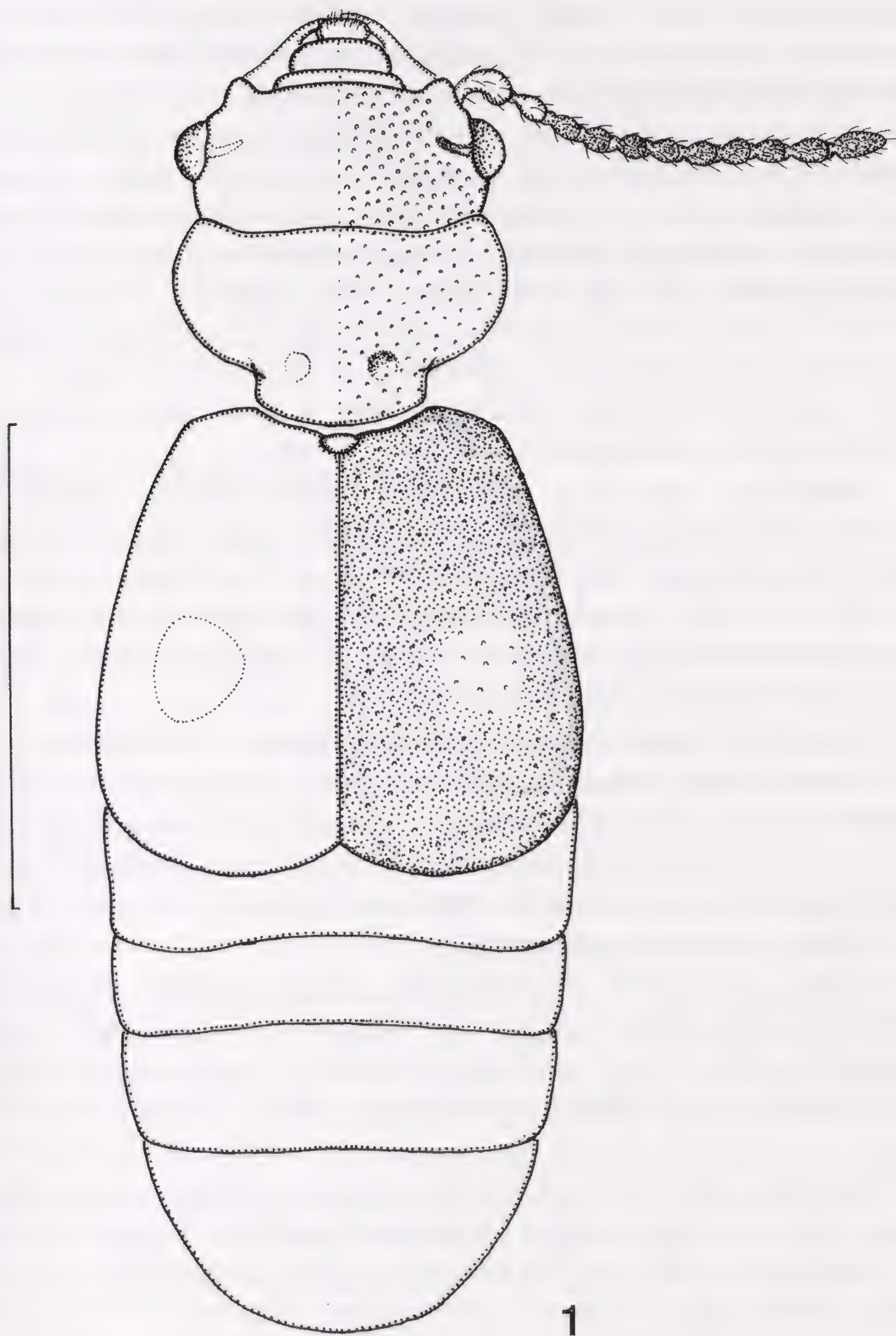


Fig. 1 - *Inopeplus pacificus* n. sp., dorsal view (scale = 1.0 mm.).

suture distinct and nearly straight, apical margin of frons with transverse depression; no longitudinal impressed line on vertex, a semicircular depression on vertex surrounding inner margin of eye less distinct, a short oblique depression arising from orbital margin; puncturation on vertex fine, rounded, moderately dense, separated by 2-4 diameter; eyes moderately large and finely faceted. Antenna moderately long and slender, scape moderately large and curved, pedicel shorter and narrower than scape, segment 3 more or less similar in proportion to pedicel, segments 4-9 subequal, about as broad as long and slightly wider than 3, segment 10 slightly elongate, segment 11 elongate and acuminate at apex; scape and pedicel reddish-brown and segment 3-11 dark brown.

Prothorax transverse, flattened, widest beyond middle and markedly narrowed towards base; lateral margin smooth, distinctly sinuate in posterior third, finely bordered from base to posterior two-thirds; small paired depressions on posterior third of pronotal disc; puncturation on pronotum roundish, finer and sparser than on vertex, separated by about 3-6 diameter.

Scutellum transverse, rounded apically and impunctate.

Elytra broader than long, widest near apex, puncturation fine, slightly sparser than on pronotum; a rounded pale spot on posterior half of each elytron and the border of which less distinct, last four (occasionally three) abdominal segments exposed.

Ventral surface blackish, shiny.

Aedeagus (Fig. 3 a,b) somewhat trilobed-type; median lobe broad, elongate with tubular tip, basal end moderately dilated; tegmen forming a ring with large dorsal cap, basal angles produced into paired struts; parameres elongate, feebly bilobed, outer lobe little narrower and apically more extended, a few setae on either lobe.

Measurements of holotype: total length 2.76 mm, width of head across eyes 0.67 mm, length of antenna 1.03 mm, length and width of prothorax 0.42 mm and 0.67 mm, length and width of elytra 0.96 mm and 1.05 mm.

Holotype: Is. Goodenough, I.1890, L. Loria (MSNG).

Paratypes: same data as holotype, 10 ex. (8: MSNG, 2: ZSI); N. Guinea mer., Waicunina, VI.1890, L. Loria, 3 ex. (2: MSNG, 1: ZSI); Mentawai, Si Oban, IV-VIII.1894, E. Modigliani, 2 ex. (ZSI).

E t y m o l o g y : the species-name refers to its occurrence in the Islands in the Pacific Ocean.

R e m a r k s : the species comes close to an insular species, *I. andamanicus* Pal & Datta, 1982 but can be distinguished by the presence of paired admedian depressions on basal third of pronotum, a suborbicular pale spot near middle of either elytron, eyes comparatively longer and tempora of head not longer than eyes. The aedeagus of *I. andamanicus* is not studied and hence could not be compared with *I. pacificus*.

***Inopeplus sthulalinga* n. sp.**

General appearance (Fig. 2) elongated, flattened, shiny, chocolate-brown, unicolourous, last three abdominal segments (occasionally four) exposed, mouthparts partially exposed.

Head broader than long, apical margin truncate, fronto-clypeal suture distinct and nearly straight, apical margin of frons with transverse depression, no longitudinal impressed line on vertex; puncturation on vertex coarse, rounded to little elongate, moderately dense, separated by 1-3 diameter; eyes moderately large and moderately coarsely faceted, orbital margin of vertex narrowly depressed, no oblique depression arises from orbital margin, tempora longer than eyes. Antenna moderately long and slender, scape moderately large and curved, pedicel shorter and narrower than scape, segment 3 more or less similar in proportion to pedicel, segments 4-10 about as broad as long and slightly transverse, broader than preceding segment and feebly wider towards apex, segment 11 elongate and broadly pointed apicad.

Prothorax slightly elongate, flattened, widest little behind front across anterior denticles and narrowed towards base; lateral margin with one anterior and two posterior denticles, finely bordered from base to anterior denticles; puncturation on pronotum roundish, finer and sparser than on vertex, slightly denser laterally, separated by about 1.5-4 diameter.

Scutellum transverse, rounded apically and impunctate.

Elytra about as broad as long, broadened posteriorly, glabrous, an outwardly directed metathoracic spine present near middle of

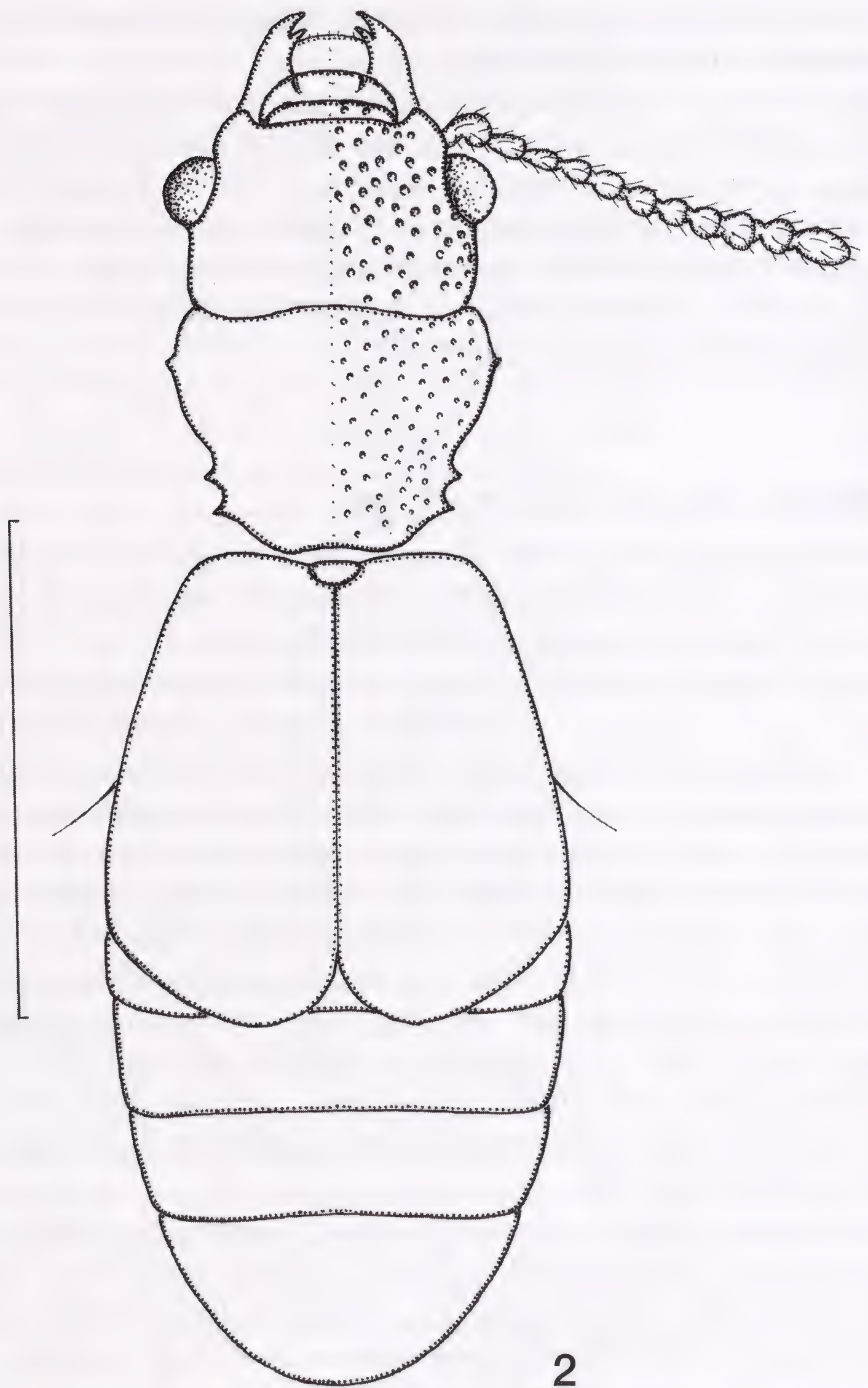


Fig. 2 - *Inopeplus sthulalinga* n. sp., dorsal view (scale = 1.0 mm.).

elytra, last three (occasionally four) abdominal segments exposed.

Ventral surface brown, shiny.

Aedeagus (Fig. 3 c, d) somewhat trilobed-type; median lobe broad, elongate, somewhat broader apically, basal end dilated; tegmen forming a ring with large dorsal cap, base on sides produced into paired struts; parameres short, elongate, apex broadly rounded with a few setae.

Measurements of holotype: total length 2.72 mm, width of head across eyes 0.63 mm, length of antenna 0.94 mm, length and width of prothorax 0.48 mm and 0.44 mm, length and width of elytra 1.00 mm and 0.93 mm.

Holotype: Is. S. Thomé, Agua-Izé, 400-700 m, XII.1900, L. Fea (MSNG).

Paratypes: same data as holotype, 3 ex. (MSNG); Is. Principe, Roca Inf. D. Henrique, I-IV.1901, 200-300 m, L. Fea, 11 ex. (7: MSNG, 4: ZSI); Is. Principe, Roca Inf. D. Henrique, V.1901, L. Fea, 2 ex. (MSNG).

E t y m o l o g y : the specific-name is the Bengali adjective 'sthulalinga', that refers to the broad penis (median lobe) of male of this species.

R e m a r k s : This species shows apparent similarity with *I. patkoicus* Pal, 1992 (northeast India) in prothoracic denticulation but can be differentiated by slightly elongate prothorax (vs. transverse in *patkoicus*), impunctate and immaculate elytra (vs. finely punctate elytra with a pair of ovoid spots in basal half in *patkoicus*); apex of median lobe of aedeagus broad and parameres distinctly different.

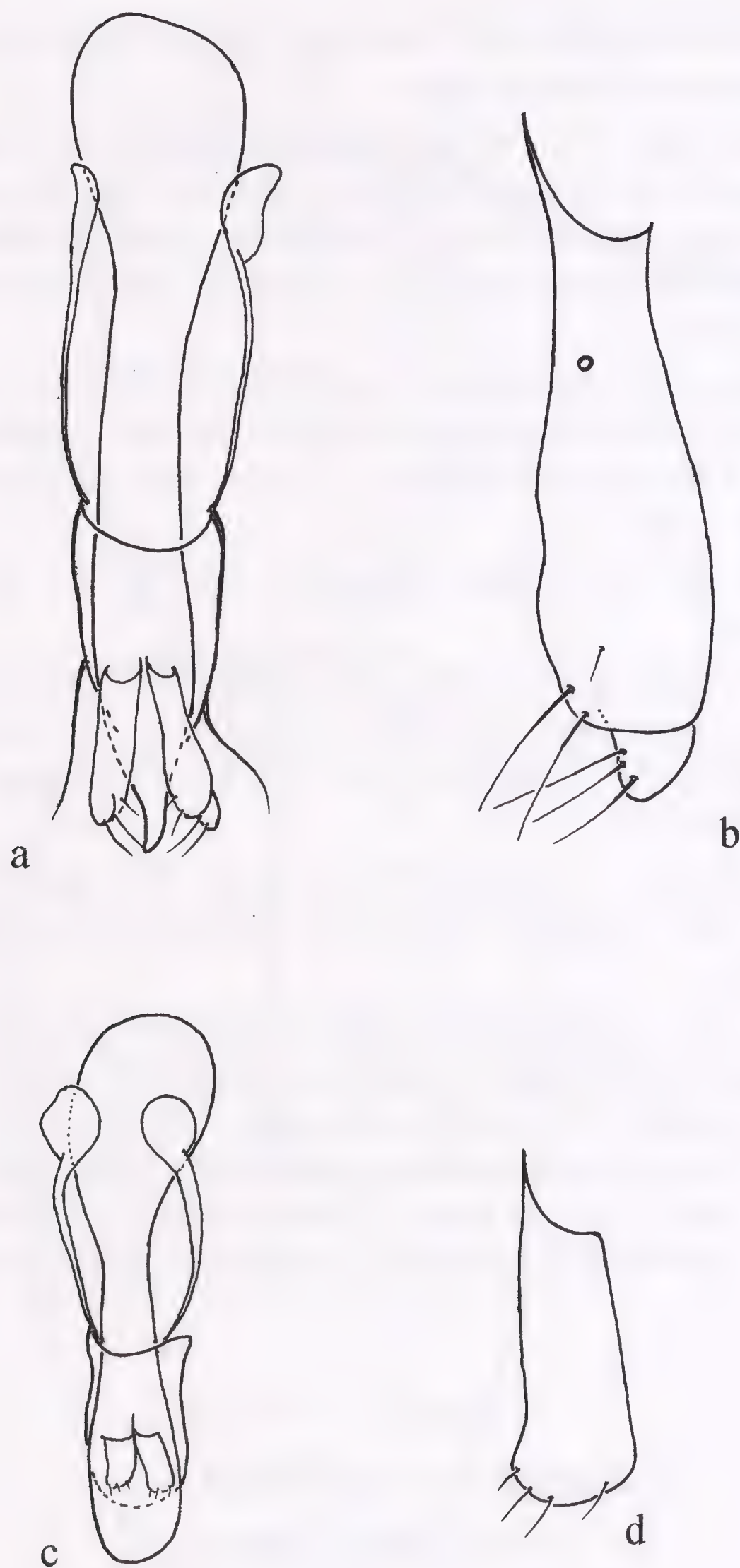
Superfamily CUCUJOIDEA

Family MONOTOMIDAE

Genus *Mimemodes* Reitter

Mimemodes sp.

Material: New Guinea, Dilo, VI-VII.1890, L. Loria, 1 ex. (MSNG).



3

Fig. 3 - Aedeagi. a, *Inopeplus pacificus* n. sp., dorsal view; b, *Inopeplus pacificus* n. sp., enlarged view of right paramere; c, *Inopeplus sthulalinga* n. sp., dorsal view; d, *Inopeplus sthulalinga* n. sp., enlarged view of right paramere.

Size: length 2.70 mm.

Remarks: this species shows certain resemblances with one Indian species, *M. kimbhutus* Sengupta, 1976, but differs by its longer tempora (more than half as long as eye) and larger eyes. The long and distinct tempora of this species is not often seen in other species of *Mimemodes*.

Genus *Indoleptipsius* Pal

Indoleptipsius poggi n. sp.

General appearance (Fig. 4) elongated, moderately depressed, mandibles partly exposed, eyes non-projecting, antennal club 1-segmented, yellowish-brown, dorsal puncturation moderately coarse, little shiny and almost glabrous, elytra exposes one tergite of abdomen.

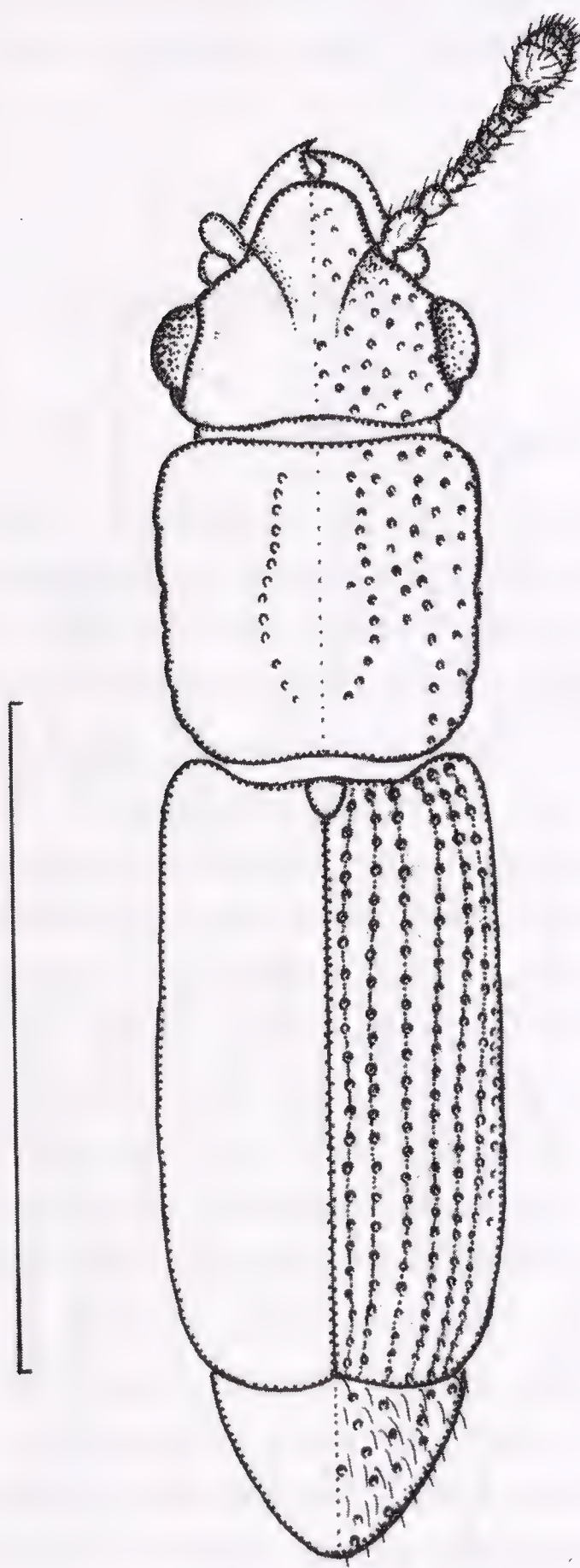
Head transverse, widest across eyes; eyes moderately large and about one-third as long as head, moderately coarsely faceted; no distinct sculpture on dorsal side except oblique, linear supra-antennal depressions; puncturation on vertex moderately coarse and less dense, separated by about 2-3 diameter, frontal area rather finely punctate. Antenna slightly longer than head, scape moderately large and broadly elongate, pedicel short and narrower than scape, segments 3-8 narrower, subequal and more or less transverse, segment 9 little wider than preceding segment; segment 10 (club) slightly elongate and about as long as preceding four segments.

Prothorax about as broad as long, slightly narrower posteriorly, front angles obtuse, hind angles rounded and not well marked, sides slightly uneven with minute notches at intervals; disc with a median elongate impunctate area which broadened posterad, puncturation on disc moderately coarse and not dense, separated by about 1.5-3 diameter.

Scutellum elongate, glabrous and apical margin rounded.

Elytra about 1.7x as long as broad, sides feebly arched, apex of each elytron separately rounded, moderately large punctures in eight regular rows along fine impressed striae lines, interstices not raised or ribbed; pygidium with moderately coarse and sparse punctures, sparsely pubescent.

On ventral side prosternum and metasternum medially impunc-

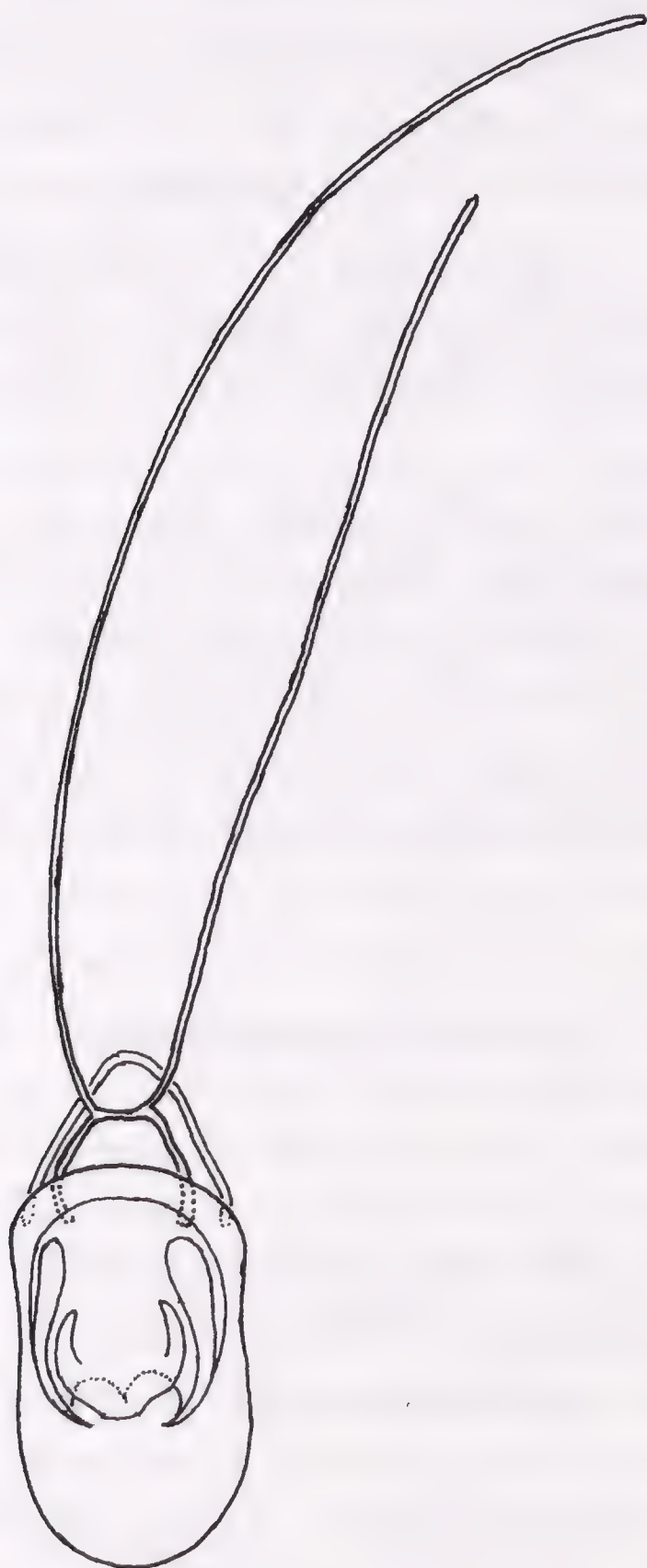


4

Fig. 4 - *Indoleptipsius poggii* n. sp., dorsal view (scale = 1.0 mm.).

tate, sparse punctures only on sides; abdominal ventrites I-IV impunctate medially and sparsely punctate on sides, last ventrite sparsely punctate-pubescent.

Aedeagus (Fig. 5) uninverted cucujoid-type; median lobe short and broad, median orifice at tip, basal foramen large; from the ventral edge of foramen arises a ring and paired long slender struts come out of this ring; tegmen forming a ring-piece and placed on ventral side of the struts.



5

Fig. 5 - *Indoleptipsius poggii* n. sp., aedeagus, dorsal view.

Measurements of holotype: total length 1.60 mm, width of head across eyes 0.38 mm, length of antenna 0.39 mm, length and width of prothorax 0.40 mm and 0.40 mm, length and width of elytra 0.80 mm and 0.46 mm.

Holotype ♂: New Guinea, Dilo, VI-VII.1890, L. Loria (MSNG).

Paratypes: same data as holotype, 11 ex. (9: MSNG, 2: ZSI); New Guinea, Ighibirei, VII-VIII.1890, L. Loria, 6 ex. (MSNG); New Guinea mer., Bujakori, VIII.1890, L. Loria, 2 ex. (ZSI); New Guinea S.E., M.ti Astrolabe, II. 1893, L. Loria, 7 ex. (6: MSNG, 1: ZSI); New Guinea, Ramoi, II.1875, O. Beccari, 2 ex. (MSNG); New Guinea, Hatam, VII.1875, O. Beccari, 1 ex. (MSNG).

E t y m o l o g y : a patronym for Dr. Roberto Poggi, Director, Museo Civico di Storia Naturale, Genova, in honour of his contribution to the systematics of beetles, and for his generous support to the present study.

R e m a r k s : this species differs from the other lone species of the genus, *I. ushae* Pal, 1996a by the sides of prothorax almost straight (vs. slightly arcuate in *ushae*), indistinctly serrated and serration notches distantly placed (vs. distinctly serrated with closely set serrulations in *ushae*), puncturation on vertex and pronotum finer and pronotum much less punctate with a medially impunctate area.

Genus *Thione* Sharp

Thione sp.

Material: Borneo, Sarawak, 1865-66, coll. G. Doria, 1 ex.; Isole Key, 1873, O. Beccari, 1 ex. (MSNG).

Size: length 4.00 mm - 4.48 mm.

Genus *Shoguna* Lewis

Shoguna feae Grouvelle

Shoguna feae Grouvelle, 1896, *Annali Mus. civ. St. nat. Genova*, (2) 16 (=36): 41.

Material: Borneo, Sarawak, 1865-66, coll. G. Doria, 1 ex. (MSNG).

Size: length 4.60.

Distribution: Myanmar; Indonesia (Sumatra, Borneo). I have examined specimens also from Andaman Is., India.

Family DISCOLOMIDAE

Genus *Aphanocephalus* Wollaston

Aphanocephalus naius n. sp.

General appearance (Fig. 6 a) oblong, ovoid, about 1.28x as long as broad, convex dorsally and flattened ventrally, shiny, pronotum and elytra glabrous, puncturation obscure; dark brown except narrow paler stripes on sides of pronotum, antennae and legs paler than dorsum.

Head small, exposed part distinctly transverse, almost concealed from above by pronotum, fronto-clypeal suture situated just in front of antennal insertions, dorsum pubescent; eyes moderately large, almost covered dorsally by pronotum; antenna (see Fig. 6 b) short, about as long as pronotum, scape moderately large, pedicel narrower and little elongate, segment 3 elongate, segments 4-7 short and subequal, segment 8 slightly wider than 7, club large, slightly elongate, about one-fourth as long as antenna and with single pre-apical annulation.

Prothorax strongly transverse (1.00:2.40), narrowed in front, front margin unemarginate, front angles bluntly rounded, lateral margin feebly rounded and finely bordered, two lateral pits situated close to anterior angle and posterior third, posterior angles acute, basal margin distinctly sinuate on either side of middle; a narrow elongate, yellowish sublateral stripe on either side of pronotum; puncturation obscure and surface glabrous.

Elytra slightly elongate (1.05:1.0), more than thrice (3.1:1.0) as long as prothorax, basal margin emarginated and fitting closely with prothorax, humeral angles blunt, widest near middle; sides evenly rounded, finely bordered and a little explanate, four lateral pits on border in basal two-thirds; surface glabrous and puncturation obscure.

Ventral side paler; prosternum impunctate or obscurely punctate; metasternum with fine and sparse punctures, impunctate mesally;

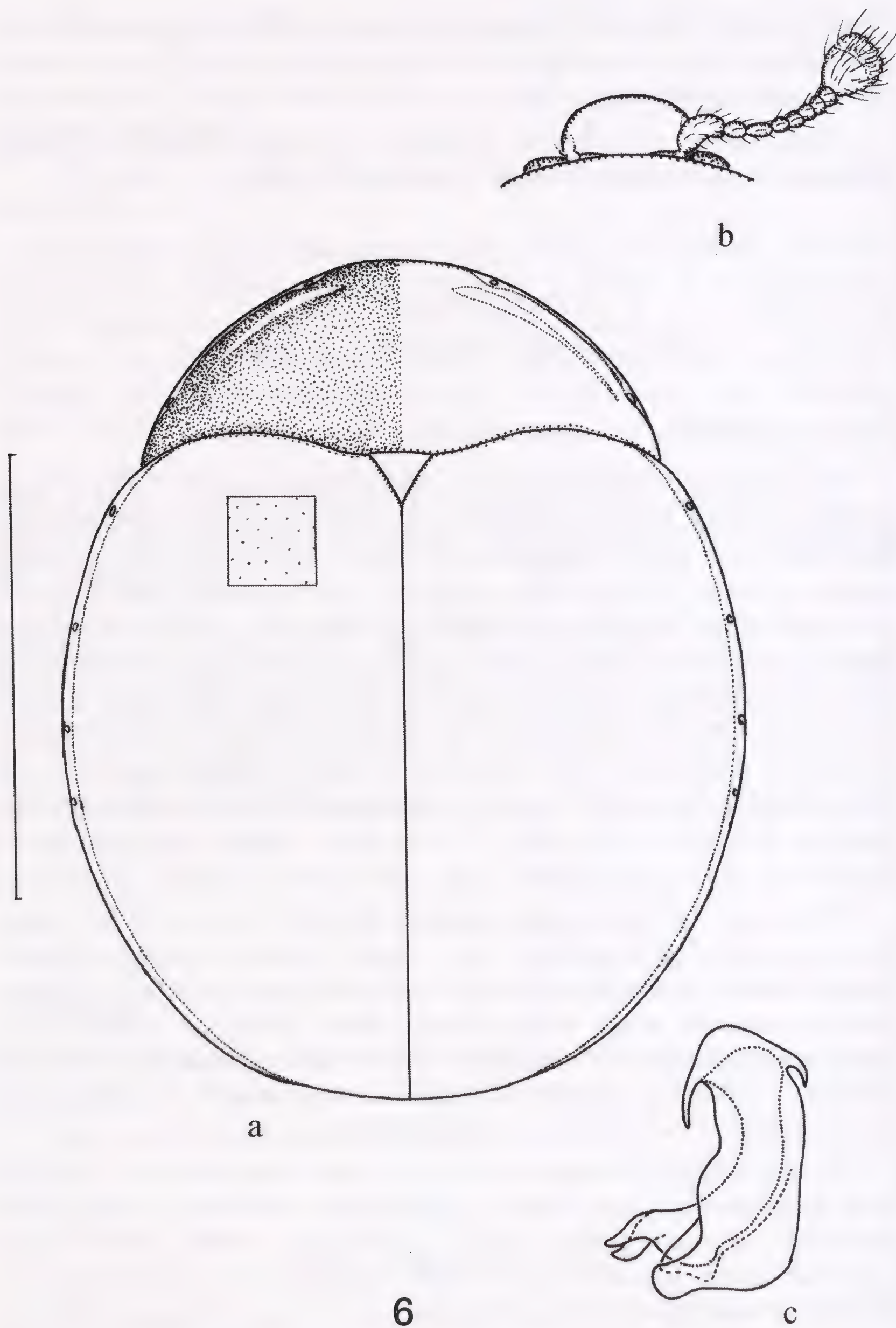


Fig. 6 - *Aphanocephalus naius* n. sp.: a, dorsal view (scale = 1.0 mm.); b, exposed part of head and antenna (scale = 1.0 mm.); c, aedeagus, lateral view.

puncturation on abdominal ventrite fine and sparse, scanty pubescence.

Aedeagus (Fig. 6 c) on one side, median lobe forming a broad tube with acuminate and bifid tip, tegmen forming a cap-piece enveloping median lobe, its proximal end broad cap-like with sharp projections on sides, its distal end bifid and blunt.

Measurements of holotype: total length 1.92 mm, length of antenna 0.50 mm, length and width of prothorax 0.50 mm and 1.20 mm, length and width of elytra 1.58 mm and 1.50 mm.

Holotype: Is. Fernando Poo, Basilè, 400-600 m, VIII-IX.1901, L. Fea (MSNG).

Paratypes: same data as holotype, 40 ex. (34: MSNG, 6: ZSI).

E t y m o l o g y : the species-name is derived from the Greek word 'nai' (ναι'), meaning yes.

R e m a r k s : this species shows resemblances with an African species, *A. decellei* John, 1964, by its largely globular facies and apparent similarity of aedeagal structure. But it can be differentiated by its deep brown pronotum with a narrow-elongate yellowish sub-lateral stripe on either side, bifid apex of median lobe with broadly acuminate tips (vs. rather spinous tips in *decellei*).

Aphanocephalus sp.

Material: M.te Camerun, Buea, 800-1200 m.s.m., VI-VII.1902, L. Fea, 7 ♀♀ (head of 1 ex. broken) (MSNG).

Size: length 1.72-1.90 mm.

R e m a r k s : this species shows apparent similarity in facies and colouration with the Indian species, *A. sikkima* Pal, 1996b. But the specific identity could not be ascertained for lack of a male specimen and examination of its aedeagus.

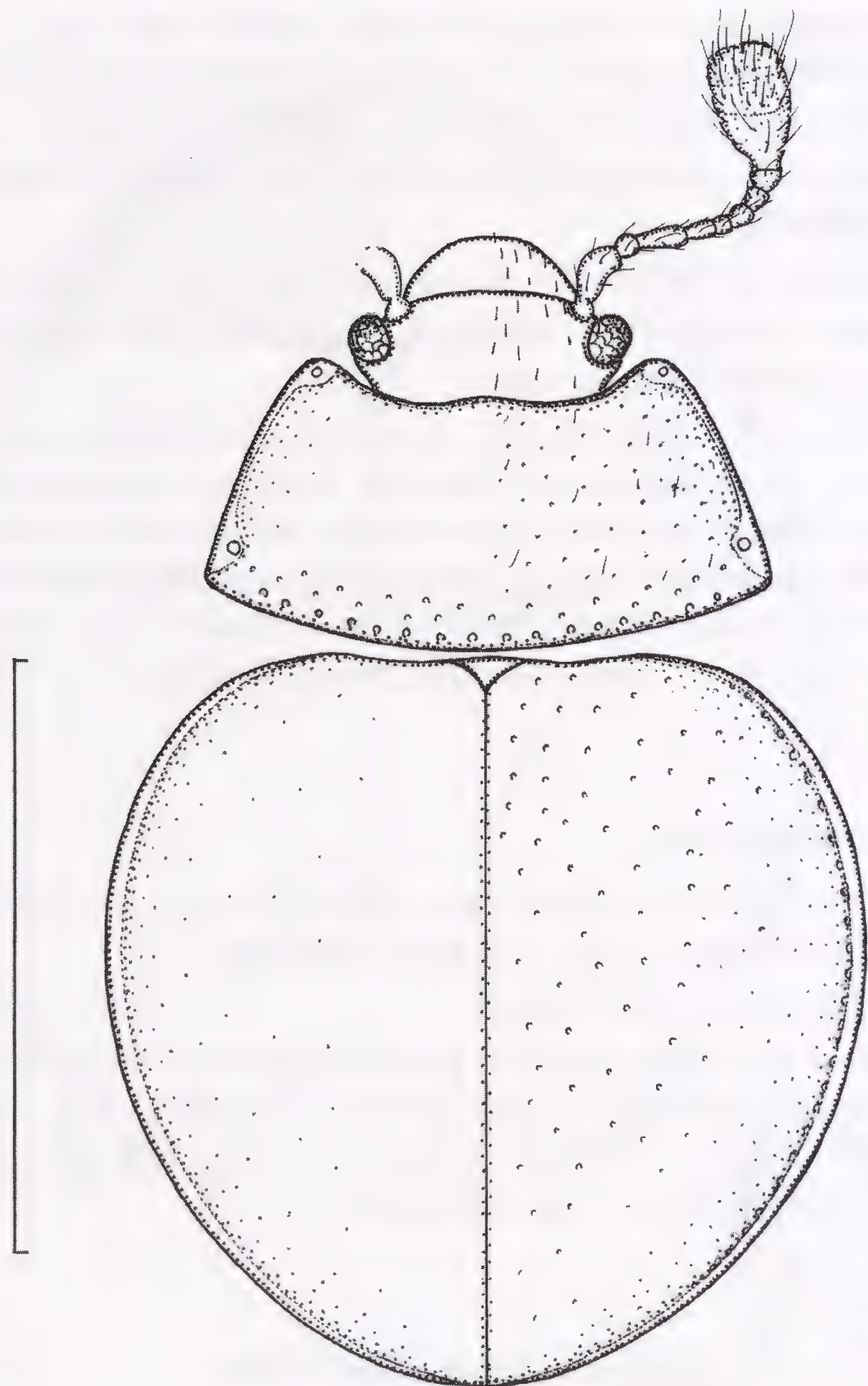
Genus *Parafallia* Arrow

Parafallia habra n. sp.

General appearance (Fig. 7) oblong, ovoid, about 1.3x as long as broad, convex dorsally and flattened ventrally, shiny, moderately

punctate, pronotum and elytra almost glabrous and head with scanty pubescence; yellowish- to reddish-brown, legs paler.

Head small, exposed part distinctly transverse, partly concealed by pronotum, fronto-clypeal suture situated in front of antennal



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Fig. 7 - *Parafallia habra* n. sp., dorsal view (scale = 1.0 mm.).

insertions, dorsum with fine and sparse pubescence; eyes moderately large, somewhat projecting and coarsely faceted; antenna moderately long, longer than pronotum, scape moderately large, pedicel short, narrower and about as broad as long, segment 3 clearly elongate, segments 4-8 short, subequal and feebly wider towards apex, club large, elongate, nearly one-third as long as antenna, with two feeble preapical annulations.

Prothorax strongly transverse (0.56:1.00), narrowed in front, front margin deeply emarginate and bisinuate, front angles broadly pointed, lateral margin feebly arched and finely bordered, two lateral pits situated close to front angle and above base, hind angles prominent and almost right angle, basal margin rounded; puncturation on pronotum fine and sparse, setae hardly seen, coarser punctures arranged more closely above basal margin.

Scutellum transverse, triangular and impunctate.

Elytra broader than long (0.96:1.00), about 2.3x as long as prothorax, basal margin emarginate and fitting with prothoracic base, humeral angles not prominent and blunt, widest near middle; sides evenly rounded, finely bordered and a little explanate; puncturation coarser than on pronotum, moderately sparsely arranged, separated by about 3-6 diameter, punctures bordering margin comparatively coarser.

Ventral side paler, sterna with moderately coarse and sparse punctures laterally and impunctate mesally, puncturation on abdominal ventrites moderately coarse and sparse, almost glabrous.

Aedeagus (Fig. 8 a,b) on one side, median lobe forming a tubular-shape; tegmen forming a cap-piece partially enveloping median lobe, distal end spatulate and studded with long setae.

Measurements of holotype: total length 1.75 mm, width of head across eyes 0.47 mm, length of antenna 0.60 mm, length and width of prothorax 0.52 mm and 0.92 mm, length and width of elytra 1.21 mm and 1.25 mm.

Holotype ♂: Sumatra, Lago Toba, II & XI.1891, E. Modigliani (MSNG).

Paratype: Sumatra, D. Tolong, XI.1890, E. Modigliani, 1 ex. (ZSI).

E t y m o l o g y: the species-name is derived from the Greek word 'habros' (ἁβρός) abròs, meaning pretty or nice.

R e m a r k s: this species shows resemblances with another

Sumatran species, *P. minima* John, 1968 in facies but can be differentiated by its front margin of prothorax emarginated and bisinuate (vs. emarginated and simply concave in *minimus*), a row of small punctures bordering posterior margin of pronotum (vs. no regular



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Fig. 8 - *Parafallia habra* n. sp., aedeagus: a, lateral view; b, tip of tegminal cap.

row of subbasal punctures in *minimus*), elytral punctures, especially in anterior half finer and sparser, antennal club with two transverse fine annulations (vs. no distinct annulation in *minimus*). Aedeagus of *P. minimus* has not been studied and hence could not be compared with that of *P. habra*.

Genus *Paramaschema* Heller

Paramaschema fark n. sp.

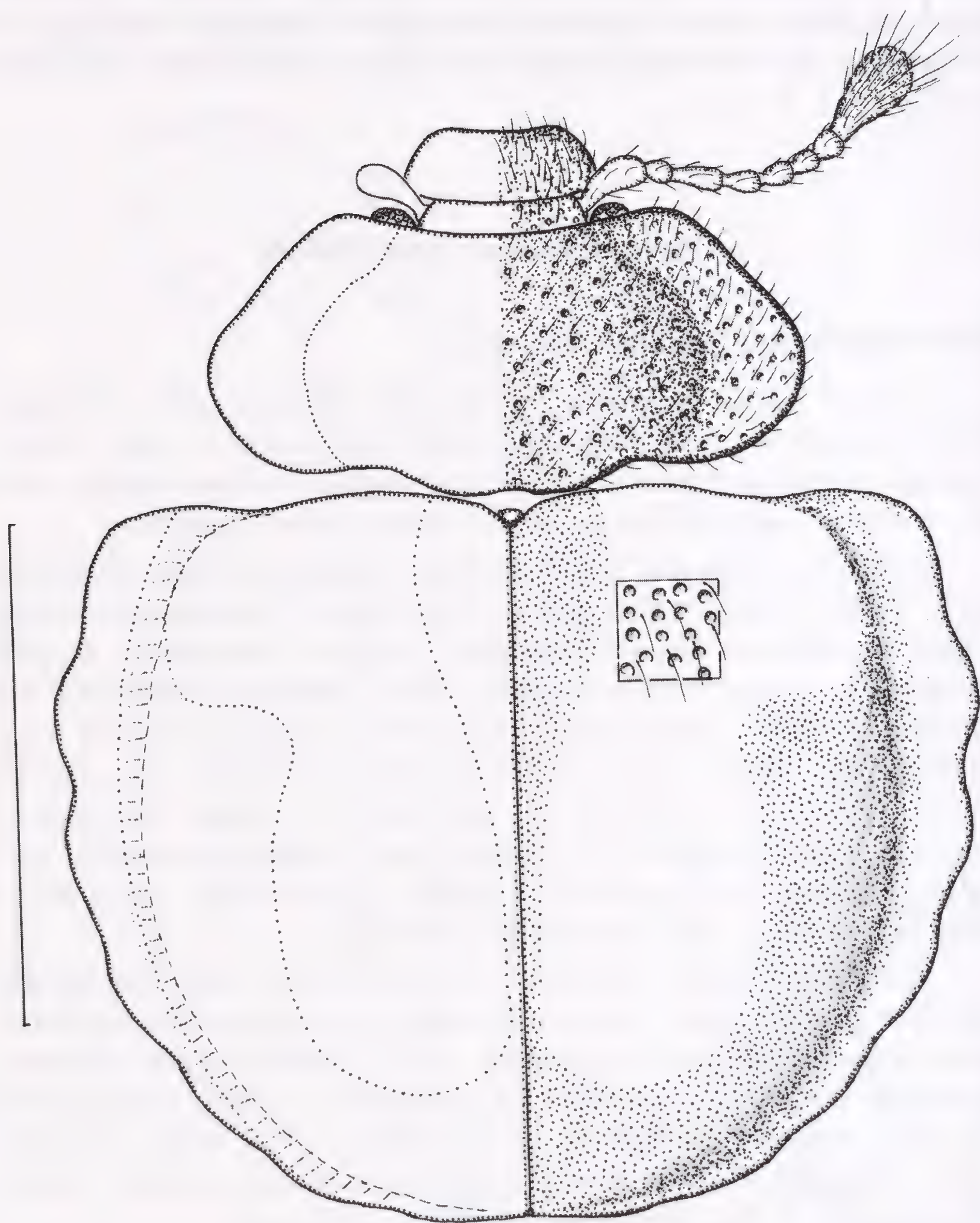
General appearance (Fig. 9) broadly oblong, convex dorsally and flattened ventrally, sides explanate and margins wavy, shiny, coarsely punctate-pubescent; reddish-brown with head, median part of pronotum, and sutural as well as sides of elytra darker.

Head small, exposed part transverse, partly concealed by pronotum, fronto-clypeal suture situated in front of antennal insertions, vertex moderately coarsely punctate, clypeus impunctate, dorsum moderately setose; eyes moderately large, somewhat projecting and coarsely faceted, considerably covered by pronotum; antenna moderately long, longer than pronotum, scape moderately large, pedicel shorter and narrower than scape, segments 3-5 longer than pedicel and subequal, segments 6-7 shorter than preceding segment, club large, elongate, balloon-shaped, slightly shorter than one-third as long as antenna, without preapical annulation.

Prothorax strongly transverse (0.56:1.00) and widest near middle, narrowed towards front, front margin deeply emarginate and concave, front angles blunt, sides outwardly curved, basal margin trisinate; pronotal disc convex and broadly explanate on sides; puncturation on disc coarse and moderately sparse, separated by about 2-4 diameter, punctures slightly denser on sides, pronotum sparsely setose; median part of disc dark brown and sides yellowish.

Scutellum transverse, triangular and impunctate.

Elytra broader than long (0.84:1.00), about 2.4x as long as prothorax; basal margin emarginate, bisinate and fitting with prothoracic base, humeral angles blunt; widest in anterior half, sides explanate, margin undulated; puncturation on elytral disc coarse, dense, separated by about 0.75-1.5 diameter, punctures obscure on explanate



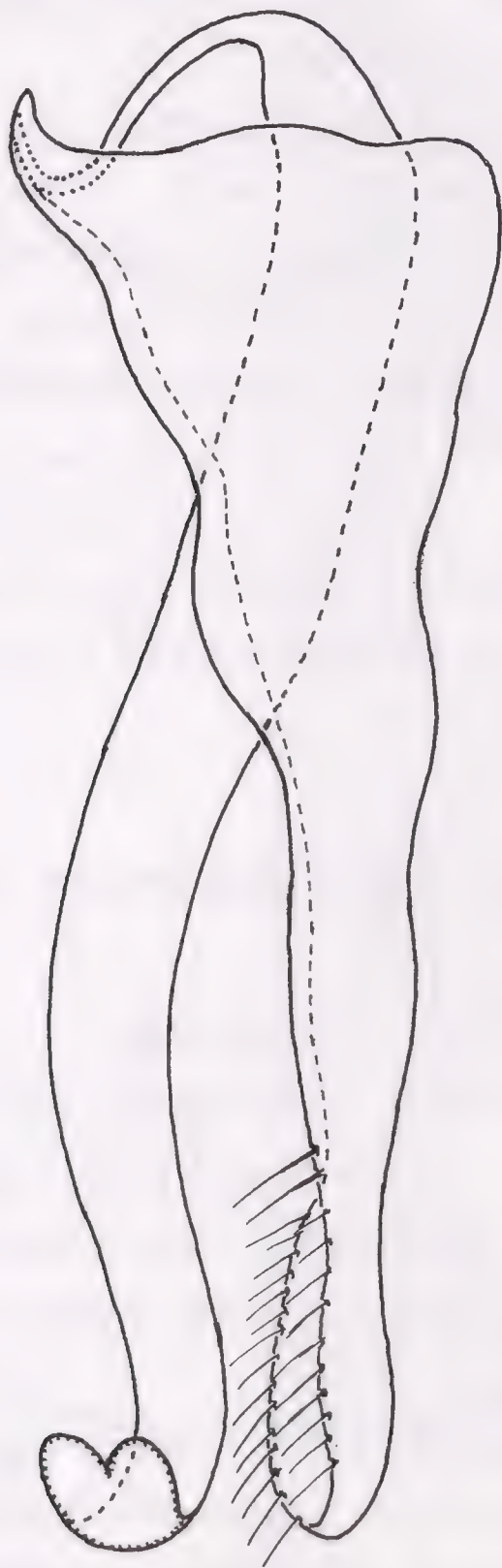
9

Fig. 9 - *Paramaschema farak* n. sp., dorsal view (scale = 1.0 mm.).

sides, setae moderately sparse but distinct; sides and sutural part of elytra darker leaving an elongate yellowish space on each elytron.

Ventral side reddish-brown, paler than dark area of dorsum; prosternum with moderately dense punctures mesally and impunctate on sides, metasternum almost impunctate; abdominal ventrites impunctate and finely setose; elytral epipleura broad, its surface slightly wavy.

Aedeagus (Fig. 10) on one side, median lobe forming a tube, its distal end bilobed; tegmen forming a cap-piece partially enveloping median lobe, its distal end spatulate and beset with setae.



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Fig. 10 - *Paramaschema farak* n. sp.: aedeagus, lateral view.

Measurements of holotype: total length 2.10 mm, width of head across eyes 0.53 mm, length of antenna 0.78 mm, length and width of prothorax 0.60 mm and 1.20 mm, length and width of elytra 1.47 mm and 1.75 mm.

Holotype ♂: Mentawai, Si Oban, IV-VIII. 1894, E. Modigliani (MSNG).

Paratype: Mentawai, Sipora, Sereinu, V-VI. 1894, E. Modigliani, 1 ex. (ZSI).

E t y m o l o g y : the specific name is the Hindi adjective 'farak' (meaning different) refers to very different appearance of the body and male genitalia of the species.

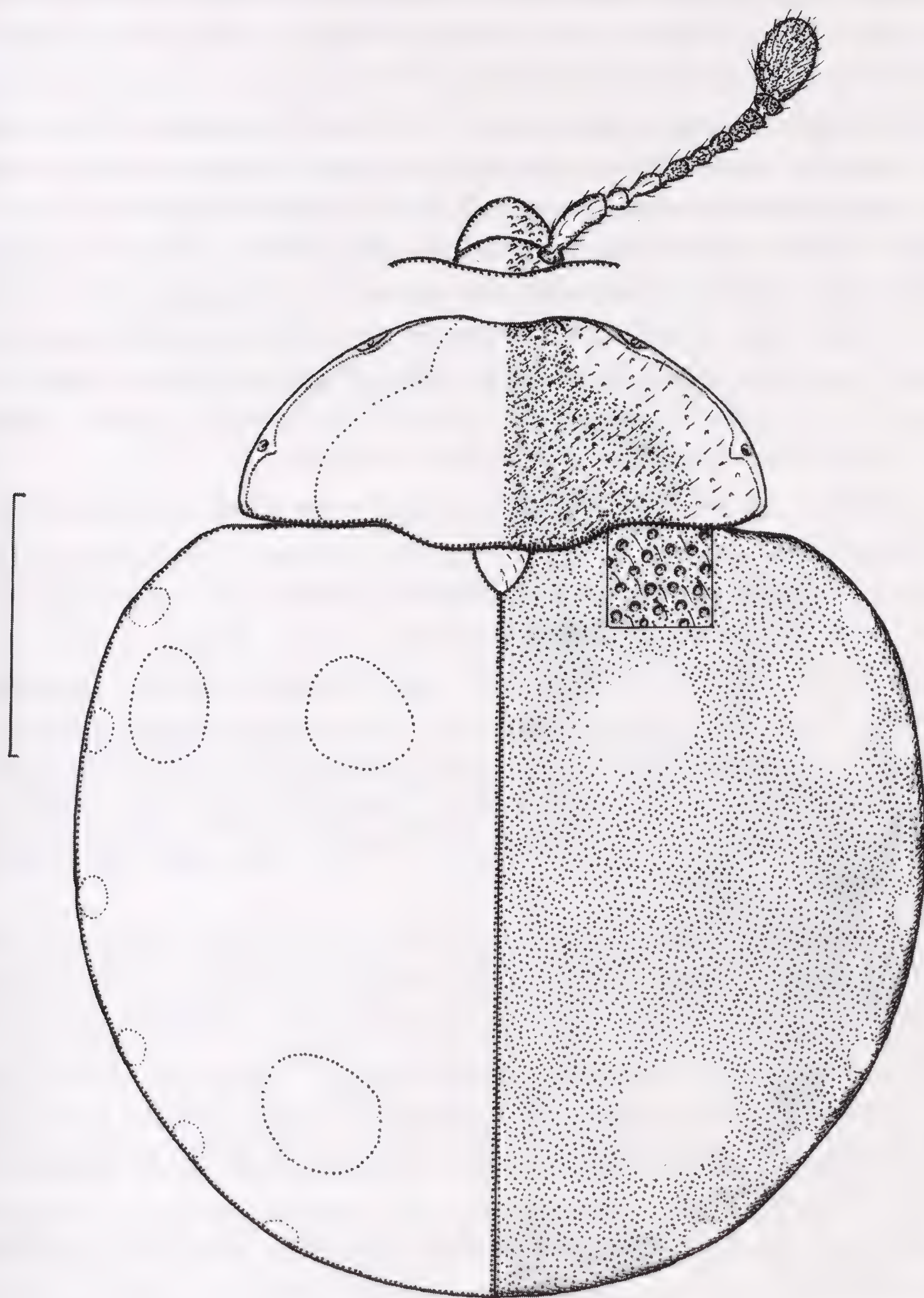
R e m a r k s : this species shows some similarity with the Japanese species, *P. tumidium* John, 1954 in slightly bicoloured dorsum but can be differentiated by the sides of pronotum lighter (vs. antero-median part of pronotum lighter in *tumidium*), elongated lighter patch from base to more than posterior third of each elytron (vs. lighter antero-median half of elytra in *tumidium*), no protuberance on humeral portion of elytra, punctures on pronotum and elytra considerably sparser. Further, unlike other species of *Paramaschema* the tip of median lobe of this species is broad and bilobed.

Genus *Cephalophanus* John

Cephalophanus c h h a k k a n. sp.

General appearance (Fig. 11) rather orbicular, convex dorsally and flattened ventrally, vestiture constituting minute setae, moderately long antenna with a distinct club; six moderately large, globular yellowish spots on blackish elytra, sides of pronotum paler than middle.

Head small, exposed part transverse, largely concealed by pronotum and hardly seen from above in dorsal view, fronto-clypeal suture situated in front of antennal insertions, dorsum punctate-pubescent; eyes moderately large, coarsely faceted, covered almost completely from above by pronotum; antenna moderately long, longer than pronotum, scape moderately large, pedicel short, narrower and about as broad as long, segment 3 elongate, segments



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Fig. 11 - *Cephalophanus chhakka* n. sp., dorsal view; exposed part of head and antenna above dorsal view of the body (scale = 1.0 mm.).

4-7 short, subequal, a little elongate or about as broad as long, segments 8-9 feebly wider than preceding segment and slightly transverse, club large, elongate and balloon-shaped, about one-fourth as long as antenna, without preapical annulation.

Prothorax strongly transverse (0.54:1.00), narrowed in front, front margin considerably emarginate and concave, front angles blunt, lateral margin feebly arched and narrowly bordered, two lateral pits situated close to front angle and slightly beneath middle, hind angles prominent and slightly acute, basal margin clearly sinuate on either side of middle; pronotal disc convex and moderately explanate at sides; puncturation on disc fine and sparse, punctures separated by about 3-6 diameter, pronotum sparsely setose; median part of pronotum blackish and sides yellowish.

Scutellum small, transverse, obscurely punctate and setose..

Elytra broader than long (0.92:1.00), about 2.7x as long as prothorax, basal margin slightly sinuate on either side of middle and fitting with prothoracic base, humeral angles blunt, widest near middle; sides somewhat explanate and margins almost rounded; punctures on elytral disc moderately coarse, separated by about 1-2 diameter, setae moderately dense and distinct, little denser on sides; elytra blackish, three large orbicular yellowish spots on each elytron- two in anterior half and one in posterior half, six smaller spots arranged close to border.

Ventral side reddish-brown medially and paler on sides; pro- and metasternum with fine and dense punctures; abdominal ventrites clearly punctate but slightly finer than on metasternum; ventrum not setose.

Measurements of holotype: total length 3.74 mm, width of head across eyes 0.80 mm, length of antenna 1.36 mm, length and width of prothorax 1.12 mm and 2.04 mm, length and width of elytra 3.08 mm and 3.32 mm.

Holotype ♀: Sumatra, Si-Rambé, XII.1890-III.1891, E. Modigliani (MSNG).

Paratypes: same data as holotype, 5 ex. (3: MSNG, 2: ZSI); Sumatra, M.te Singalang, VII.1878, O. Beccari, 1 ex. (MSNG).

E t y m o l o g y : the specific name is the Bengali adjective 'chhakka', meaning six, that refers to the six large orbicular spots on elytra.

R e m a r k s : this species shows some similarity with the

North Bornean species, *C. keninganus* John, 1967 and *C. octopunctatus* John, 1967 in partially lighter pronotum and presence of orbicular lighter patches on dark brown elytra. But this species can be distinguished from the above and other known species of *Cephalophanus* in having interruption of lateral lighter band of pronotum in antero-median part, presence of three large yellowish orbicular spots on each elytron in addition to six small spherical marginal spots, elytral punctures are slightly coarser and denser than in *C. keninganus* and *C. octopunctatus*. In the paratype of *C. chhakka* from Mount Singalang the lateral lighter bands of pronotum are confined near the hind angles leaving remaining part of pronotum dark brown.

Family CERYLONIDAE

Genus *Euxestus* Wollaston

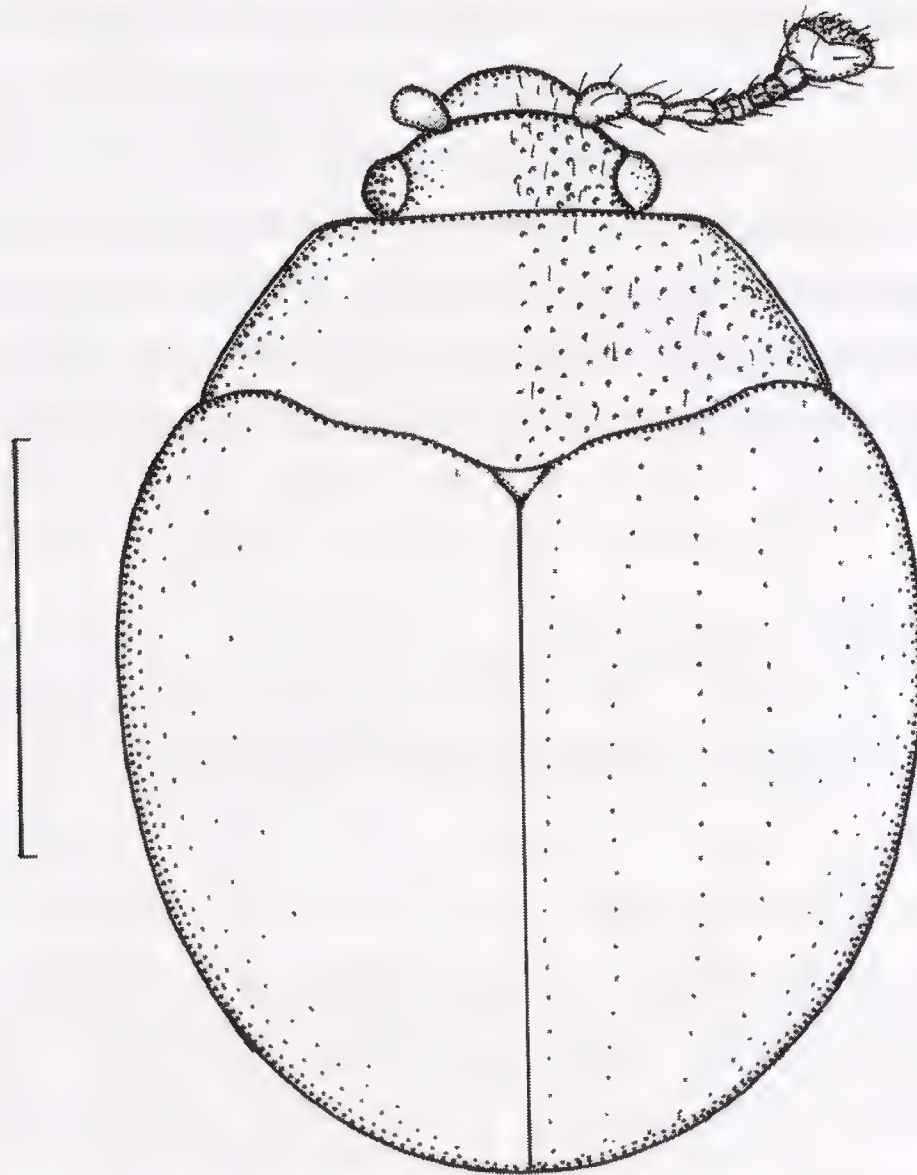
Euxestus grandis n. sp.

General appearance (Fig. 12) hemispherical, about 1.3x as long as broad, convex dorsally and flattened ventrally, shiny, dorsum with fine and moderately sparse punctures, almost glabrous; reddish-brown, legs paler.

Head small, exposed part distinctly transverse, partly concealed by pronotum, fronto-clypeal suture situated in front of antennal insertions, clypeus broad and front margin rounded, labrum partly visible, frons and vertex evenly convex; puncturation on vertex moderately fine, irregular, separated by about 1-3 diameter; eyes moderately large, somewhat projecting and coarsely faceted. Antenna moderately long, longer than pronotum, resting in antennal cavities in repose, scape moderately large and curved, pedicel short, narrower and about as broad as long, segment 3 elongate, segments 4-8 short, subequal and transverse, segment 9 slightly wider than preceding segment; club large, about as broad as long and somewhat oblique, with subapical transverse impression and apical setose lobe.

Prothorax strongly transverse (0.42:1.00), narrowed in front, front margin slightly emarginate, front angles obtusely rounded; lateral margin feebly arched, smooth and finely bordered; hind angles slightly acute from above, basal margin slightly bisinuate on either

side of scutellum; puncturation on pronotum finer than on vertex, moderately sparsely arranged, separated by about 2-4 diameter, setae scanty and obscure.



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Fig. 12 - *Euxestus grandis* n. sp., dorsal view (scale = 1.0 mm.).

Scutellum transverse, triangular and impunctate.

Elytra broader than long (0.94:1.00), about 2.7x as long as prothorax, basal margin emarginate and fitting with prothoracic base, humeral angles not prominent and blunt, widest near anterior third; sides evenly rounded; some minute punctures arranged in widely separated linear rows, setae obscure.

Ventral side not paler than dorsum; sides of prosternum with well developed cavities for reception of antennae, median part of prosternal process longitudinally ridged; metasternum with sparse

punctures laterally and almost impunctate mesally; abdominal ventrites with fine and moderately sparse punctures, glabrous.

Measurements of holotype: total length 2.60 mm, width of head across eyes 0.74 mm, length of antenna 0.76 mm, length and width of prothorax 0.65 mm and 1.52 mm, length and width of elytra 1.80 mm and 1.90 mm.

Holotype: Mentawai, Sipora, Sereinu, V-VI.1894, E. Modigliani (MSNG).

Paratypes: same data as holotype, 1 ex. (MSNG); Sumatra, Siboga, X-1890-III.1891, E. Modigliani, 1 ex. (ZSI).

E t y m o l o g y : The species name is derived from the Latin word 'grandis', meaning large, that refers to its comparatively larger body size.

R e m a r k s : This species differs from two Sumatran species, *E. translucidus* Motschulsky, 1859 and *E. erithacus* (Chevrolat, 1863) by more convex and globose shape, prothorax more diverging posteriorly and more transverse (1.0:2.5 vs. 1.0:1.8 in *translucidus* and *erithacus*), linear arrangement of elytral punctures (vs. confused in *translucidus* and *erithacus*), antennal club segment obliquely transverse (inner margin shorter than outer margin vs. bilaterally symmetrical in *translucidus* and *erithacus*), and larger body size (2.6 mm. long vs. 1.9-2.2 mm. long in *translucidus* and *erithacus*).

Family SPHAEROSOMATIDAE

Genus *Sphaerosoma* Leach

Sphaerosoma sp.

Material: Sumatra, Padang, 1890, E. Modigliani, 1 ex. (MSNG).

Size: length 2.05 mm.

ACKNOWLEDGEMENTS

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beetles and for generous support. I am indebted to Dr. J. R. B. Alfred, Director, Zoological Survey of India, Kolkata for providing necessary facilities for the work.

REFERENCES

- CHEVROLAT A., 1863 - Coléoptères de l'île de Cuba. Notes, synonymies et descriptions d'espèces nouvelles - *Annls. Soc. ent. Fr.*, Paris, (4), 3: 589-620.
- JOHN H., 1954 - Notizen über *Paramaschema* (Col., Notiophygidae). Eine Ergänzung und eine Neubeschreibung - *Idea*, Djakarta, 10 (1-2): 13-15.
- JOHN H., 1964 - Neue Spezies von *Aphanocephalus* Woll. (Coleoptera: Discolomidae) - *Rev. Zool. Bot. afr.*, Tervuren, 69 (1-2): 137-164.
- JOHN H., 1967 - Neue Spezies der Gattungen *Cephalophanus* John und *Aphanocephalus* Woll. (Coleoptera: Discolomidae) - *Pacif. Ins.*, Honolulu, 9 (2): 257-264.
- JOHN H., 1968 - Discolomidae des Amsterdam Museum - *Ent. Bericht.*, Amsterdam, 28: 190-195.
- MOTSCHULSKY V. de, 1859 - Insectes des Indes Orientales et de contrées analogues - *Étud. ent.*, Helsingfors, 8: 25-146.
- PAL T. K., 1992 - A new Inopeplid species (Coleoptera: Cucujoidea) from Patkoi Hill Range of Arunachal Pradesh - *J. Bombay nat. Hist. Soc.*, 89 (2): 238-241.
- PAL T. K., 1996a - *Indoleptipsius ushae*, a new genus and species of Rhizophagidae (Coleoptera: Cucujoidea) from Arunachal Pradesh, India - *Hexapoda*, Madras, 8 (1): 1-7.
- PAL T. K., 1996b - Three new species of Discolomidae (Coleoptera: Clavicornia) from Sikkim, India - *Hexapoda*, Madras, 8 (1): 9-17.
- PAL T.K. & DATTA A. K., 1982 - Inopeplidae (Coleoptera) from Andaman Islands, India - *Rec. zool. Surv. India*, Calcutta, 79: 469-473.
- SENGUPTA T., 1976 - On the Genus *Mimemodes* (Rhizophagidae: Coleoptera) with descriptions of new species from India - *J. zool. Soc. India*, Calcutta, 28 (1-2): 67-73.

ABSTRACT

Determination of a collection of heteromeroid and cucujoid beetles of the Museo Civico di Storia Naturale "G. Doria", Genoa revealed 15 species belonging to 6 families, viz., Othniidae, Inopeplidae, Monotomidae, Discolomidae, Cerylonidae and Sphaerosomatidae. These include 2 new species of Inopeplidae: *Inopeplus pacificus* (Pacific Islands, Mentawai), *Inopeplus sthulalinga* (West African Islands); 1 new species of Monotomidae: *Indoleptipsius poggii* (New Guinea); 4 new species of Discolomidae: *Aphanocephalus naius* (West African Islands), *Parafallia habra* (Sumatra), *Paramaschema farak* (Mentawai), *Cephalophanus chhakka* (Sumatra); and 1 new species of Cerylonidae: *Euxestus grandis* (Mentawai, Sumatra). The inventory of the material including descriptions of the new species is presented.

RIASSUNTO

Su una collezione di Heteromera e Cucujoidea del Museo Civico di Storia Naturale "G. Doria" di Genova (Coleoptera, Polyphaga).

A seguito dell'esame di una serie di esemplari conservati da oltre un secolo nelle collezioni del Museo di Genova, l'Autore elenca una quindicina di specie, descrivendone ed illustrandone otto nuove:

Inopeplidae = *Inopeplus pacificus* n. sp. (Is. Goodenough, Nuova Guinea e Mentawai), *I. sthulalinga* n. sp. (Is. S. Thomé e Is. Principe)

Monotomidae = *Indoleptipsius poggii* n. sp. (Nuova Guinea)

Discolomidae = *Aphanocephalus naius* n. sp. (Is. Fernando Poo), *Parafallia habra* n. sp. (Sumatra), *Paramaschema farak* n. sp. (Mentawai), *Cephalophanus chhakka* n. sp. (Sumatra)

Cerylonidae = *Euxestus grandis* n. sp. (Mentawai e Sumatra).

ROBERTO BATTISTON* & PAOLO FONTANA**

RICERCHE ZOOLOGICHE DELLA NAVE OCEANOGR-
FICA "MINERVA" (C.N.R.) SULLE ISOLE CIRCUMSARDE.
XXX. EMBIIDINA
(INSECTA)

INTRODUZIONE

Attualmente nel mondo sono note almeno 250 specie per l'Ordine Embiidina distribuite in gran parte nelle regioni tropicali. Una piccola parte è presente nel bacino del Mediterraneo (ROSS 1966) e soltanto 7 entità sono note per l'Italia. Gran parte di queste ultime è endemica (FAILLA *et al.* 1995; FONTANA 2002; FONTANA *et al.* 2002). La presenza di questi insetti nei Musei e nelle collezioni europee è scarsa e la loro conoscenza molto limitata, sebbene essi sembrino localmente abbastanza comuni.

MATERIALI E METODI

Gli Embiotteri raccolti nelle piccole isole circumsarde nel corso delle esplorazioni svolte con la nave oceanografica del C.N.R. "Minerva" sono tutti conservati in alcool nella collezione del Museo Civico di Storia Naturale di Genova (MSNG); si tratta di un buon numero di esemplari (oltre 200), ma purtroppo nella stragrande maggioranza dei casi sono state reperite solo forme immature o femmine, che non permettono una identificazione sicura. In una sola occasione è stato raccolto un maschio adulto, che è stato montato su vetrino in Balsamo del Canada, secondo la tecnica descritta in FONTANA *et al.* 2002.

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RISULTATI

Embia tyrrhenica Stefani, 1953

Materiale esaminato: Sardegna, Is. Molara, presso sorgente (SS), 8.VI.1989, leg. R. Poggi, 1 ♂ (MSNG).

Distribuzione: specie mediterranea, nota fino ad ora per poche località in Italia e in Croazia (ROSS 1966; FONTANA *et al.* 2002).

sp. indet.

Materiale esaminato: 12 ♀♀ e 204 immaturi (di seguito indicati con "i.).

Allo stato attuale delle nostre conoscenze, come detto, per questi esemplari (tutti in MSNG) non si può giungere ad una sicura identificazione, ma si ritiene comunque utile fornire l'elenco completo dei reperti, sperando che su questa base future ricerche in loco possano portare al reperimento dei maschi indispensabili per il riconoscimento.

La successione delle isole segue l'ordinamento adottato in BACCETTI *et al.*, 1989.

- Is. Razzoli, 26.IX.1985 e 13.XI.1986, 3 i., R. Poggi;
- Is. La Presa, 16.X.1989, 1 i., R. Poggi;
- Is. Spargi, Cala Grano, 16.X.1989, 2 i., R. Poggi;
- Is. Spargiotto, 25.IX.1985, 1 i., R. Poggi;
- Is. Maddalena, 12.XI.1986, 1 i., M. Bologna; id., Dint. La Maddalena, 23.IX.1985, 6 i., R. Poggi; id., Bacino artificiale, 13.XI.1986, 1 i., L. Tonon; id., Spalmatore, 18.VI.1989, 2 i., R. Poggi; id., I Pozzoni, 14.X.1989, 5 i., R. Poggi; id., Case Fanguetto, 14.X.1989, 1 i., R. Poggi; Cala Bassa Trinità, 14.X.1989, 1 i., R. Poggi;
- Is. S. Stefano, 12.XI.1986, 1 i., R. Poggi;
- Is. Caprera, Pendici M.te Teialone, 15.X.1989, 4 i., R. Poggi; id., Forte Settentrionale, 15.X.1989, 2 i., R. Poggi;
- Is. delle Bisce, 11.XI.1986, 7 i., R. Poggi;
- Is. delle Rocche, 11.XI.1986, 6 i., R. Poggi;
- Is. Poveri I, 11.IV.1986, 1 i., R. Poggi; id., 11.IV.1986, 1 ♀, R. Argano;

- Is. Poveri II, 11.IV.1986, 1 ♀, R. Poggi;
- Is. Camere W, 11.IV.1986, 1 ♀, R. Argano & V. Cottarelli; id., 1 ♀, M. Bologna; id., 1 i., R. Poggi; id., 3.VIII.1987, 2 i., R. Poggi;
- Is. Camere E, 11.IV.1986, 4 i., R. Poggi;
- Is. Figarolo, 28.VII.1986 e 11.IX.1987, 3 i., R. Poggi;
- Is. Verde, 2.VII.1987, 5 i., R. Poggi;
- Is. Tavolara, 27.IX.1985, 9.XI.1986, 13.IX.1987 e 8.VI.1989, 1 ♀, 7 i., R. Poggi; id., 9.XI.1986, 4 i., M. Bologna;
- Is. Molara, 28.VII.1986, 28.XI.1986 e 8.VI.1989, 4 i., R. Poggi; id., 2.IV.1986, 1 i., R. Argano; id., 10.XI.1986, 1 i., L. Tonon;
- Is. Molarotto, 27.IX.1985, 10.IV.1986 e 12.IX.1987, 97 i., R. Poggi; id., 10.IV.1986, 5 i., M. Bologna;
- Is. Varaglione Sud, 30.VII.1986, 1 ♀, R. Poggi;
- Is. Serpentara, 25.VI.1987 e 9.VI.1989, 4 i., R. Poggi;
- Is. dei Cavoli, 9.VI.1989, 1 i., R. Poggi;
- Is. la Vacca, 26.VI.1987, 14.VI.1989 e 10.V.1988, 1 ♀ e 7 i., R. Poggi; id., 26.VI.1987, 1 ♀, V. Cottarelli;
- Is. il Toro, 10.V.1988, 1 ♀, R. Poggi;
- Is. S. Antioco, Stagno de Cirdu, 12.VI.1989, 1 i., R. Poggi;
- Is. S. Pietro, Pendici M.te Guardia dei Mori, 8.VII.1990, 1 i., R. Poggi;
- Is. Mal di Ventre, 28.VI.1987, 1 ♀, R. Poggi;
- Is. Piana di Alghero, 29.VI.1987 e 15.VI.1989, 6 i., R. Poggi;
- Is. dei Porri, 29.VI.1987, 1 i., R. Poggi;
- Is. Asinara, 12.X.1989, 1 ♀, R. Poggi; id., Cala Arena, 1.VII.1987, 2 i., R. Poggi; id., Cala Reale, 15.V.1988, 1 ♀, V. Cottarelli; id., Cala Reale, 9.VII.1990, 1 i., R. Poggi;
- Is. Scombro, 13.X.1989, 1 i., R. Poggi;

CONCLUSIONI

Le isole circumsarde, secondo la Lista delle Isole Italiane IIA, ammontano a 182, gran parte delle quali sono per lo più di piccole dimensioni o scogli. Il Grande Atlante d'Italia dell'Istituto Geografico De Agostini a scala 1:300.000 ne individua soltanto 57 compresi

3 scogli maggiori. La presenza di Embiidina è stata finora rilevata da Aprile fino agli ultimi giorni di Novembre in 30 isole, più della metà di quelle di più ampie dimensioni.

La maggior parte di queste era collegata alla Sardegna tramite terre emerse fino ad almeno 15.000 anni fa, quando il livello del mare ha iniziato a crescere dopo la glaciazione wurmiana; questo spiega l'ampia diffusione del gruppo in tali ambienti. L'isola più piccola su cui sono stati rinvenuti Embiidina è il piccolo arcipelago granitico dei Varaglioni il cui scoglio più grande misura circa 0.027 km quadrati e dista dalla costa 3 km.

Interessanti rimangono quindi l'antichità e la vastità della colonizzazione, per insetti dalle abitudini sedentarie e molto resistenti ai cambiamenti ambientali annuali e stagionali.

BIBLIOGRAFIA

- BACCETTI B., COBOLLI SBORDONI M. & POGGI R., 1989 - Ricerche zoologiche della nave oceanografica "Minerva" (C.N.R.) sulle isole circumsarde. I. Introduzione - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 87: 127-136.
- FAILLA M. C., LA GRECA M., LOMBARDO F., MESSINA A., SCALI V., STEFANI R. & VIGNA TAGLIANTI A., 1995 - Blattaria, Mantodea, Isoptera, Orthoptera, Phasmatodea, Dermaptera, Embioptera. In: Minelli A., Ruffo S. & La Posta S. (eds.), Checklist delle specie della fauna italiana, 36 (1994) - Ed. Calderini, M. Bologna, 23 pp.
- FONTANA P., 2002 - Contribution to the knowledge of mediterranean Embiidina with description of a new species of the genus *Embia* Latreille, 1825 from Sardinia (Italy) (Insecta Embiidina) - *Atti Acc. Rov. Agiati*, Rovereto, a. 252, ser. VIII, 2 (B): 39-50.
- FONTANA P., BUZZETTI F. M., COGO A. & ODE B., 2002 - Guida al riconoscimento e allo studio di Cavallette, Grilli, Mantidi e insetti affini del Veneto (Blattaria, Mantodea, Isoptera, Orthoptera, Phasmatodea, Dermaptera, Embiidina) - Ed. Museo Natur. Archeol. Vicenza, 592 pp.
- KRAUSS H. A., 1911 - Monographie der Embien - *Zoologica*, Stuttgart, 60: 1-78.
- ROSS E. S., 1966 - The Embioptera of Europe and the Mediterranean Region - *Bull. Brit. Mus. (Nat. Hist.), Ent.*, London, 17: 275-326.
- ROSS E. S., 2000 - *Embia*. Contributions to the Biosystematics of the Insect Order Embiidina - *Occ. Papers Calif. Acad. Science*, San Francisco, 149: (part 1)1-53; (part 2)1-36.
- STEFANI R., 1953 - Nuovi Embiotteri della Sardegna - *Boll. Soc. ent. ital.*, Genova, 83: 84-98.

RIASSUNTO

Sono presentati nuovi dati sugli Embiidina delle isole della Sardegna. Un'analisi del materiale conservato nel Museo Civico di Storia Naturale di Genova ha rilevato che la gran parte degli individui raccolti e conservati è composta da immaturi, quindi non identificabili, fatta qui eccezione per un solo maschio di *Embia tyrrhenica* Stefani 1953. Vengono proposte alcune considerazioni geografiche ed ecologiche sulla distribuzione e la presenza stagionale degli Embiidina nelle isole circumsarde.

ABSTRACT

Zoological researches of the oceanographic ship "Minerva" (C.N.R.) on the islands around Sardinia. XXX. Embiidina. (Insecta).

New data on Embiidina on the islands around Sardinia are presented. An analysis of the material preserved in the Museo Civico di Storia Naturale di Genova (Italy) shows that the largest part of the specimens preserved in the collection is represented by immature specimens, therefore unidentifiable, with the exception of a male of *Embia tyrrhenica* Stefani 1953. Some geographical and ecological considerations are presented concerning the distribution and the seasonal occurrence of Embiidina in the circumsardinian islands.

CHI-FENG LEE* & MANFRED JÄCH**

NEW SPECIES AND NEW RECORDS OF PSEPHENIDAE
FROM ASIA
(COLEOPTERA)

INTRODUCTION

Most genera of Psephenidae have been reviewed taxonomically. Recently we received a number of unidentified specimens for identification. Among this material, the Iranian psephenids are especially noteworthy, because this family has never been recorded from that country.

In this paper we describe four new species from Iran, India, Malaysia and Indonesia, and we provide new distribution records for 13 taxa.

MATERIAL AND METHODS

The terminology used herein follows LEE, YANG & SATÔ (1997, 1999) for *Macroebria* Pic, LEE, YANG & SATÔ (1998) for *Ectopria* LeConte and LEE, JÄCH & YANG (1998) for *Schinostethus* Waterhouse.

Specimens examined are deposited in the following museums or institutions:

BMNH	The Natural History Museum, London, United Kingdom
MSNG	Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy

* Applied Zoology Division, Taiwan Agricultural Research Institute, Taichung, Taiwan.

** Naturhistorisches Museum, Vienna, Austria

Correspondence: Chi-Feng Lee, Applied Zoology Division, Taiwan Agricultural Research Institute, Wudeng, 413 Taichung, Taiwan. E-mail: chifenglee@gmail.com

NMEG	Naturkundesmuseum, Erfurt, Germany
NMNS	National Museum of Natural Science, Taichung, Taiwan
NMPC	National Museum (Natural History), Prague, Czech Republic
NMW	Naturhistorisches Museum, Vienna, Austria

In the species descriptions the following abbreviations are used:

LE = maximum length of elytron

LP = length of middle of pronotum

WE = maximum width of elytra

WP = maximum width of pronotum

***Dicranopselaphus brevicornis* Lee & Yang**

Dicranopselaphus brevicornis Lee & Yang, 1996: 173

1 ♂: “Indonesia: Sulawesi Utara, Dumoga-Bone N. P. April-May 1985, ‘Clarke’ Camp Lower montane forest, 1140 m, R. Ent. Soc. Lond., Project Wallace B.M. 1985-10, Malaise trap” (BMNH); 1 ♀, same as previous, but with different date (6 December 1985) and altitude (Lowland forest ca. 200m) (BMNH).

Distribution: Indonesia (Sumatra, Sulawesi: new record).

***Dicranopselaphus emmanueli* (Pic)**

Grammeubria emmanueli Pic, 1918: 13

Dicranopselaphus emmanueli (Pic): LEE & YANG 1996; LEE, YANG & SATÔ 2000

1 ♂, 2 ♀♀: “Sarawak, Kuching dist. Mt. Penrissen, 1000 m 24-26.3.1994 Sv. Bílý leg.” (NMPC); 1 ♂: “Malaysia-W, Pahang 20 km E of Ioph, 1500 m Cameron Highlands, Tanah Rata, 16-18.IV.2000, P. Čechovský leg.” (NMPC); 1 ♂: “Malaysia W., Johor 40 km N of Kota Tinggi Kampong Uhi Sedili env. 23-28.III.2004, Čechovský Petr leg.” (NMPC).

Distribution: Philippines (Luzon, Mindanao, Palawan), East

Malaysia (Sabah, Sarawak), West Malaysia (Pahang, Johor: new records), Indonesia (Sumatra).

***Dicranopselaphus flavus* Lee & Yang**

Dicranopselaphus flavus Lee & Yang, 1996: 174

1 ♂: "Urung Tama Sibolangit, E. Sumatra, 30.X.1999, H. Taki-zawa leg." (NMNS).

Distribution: East Malaysia (Sabah), Indonesia (Sumatra: new record).

***Dicranopselaphus imparis* Lee & Yang**

Dicranopselaphus imparis Lee & Yang, 1996: 565

1 ♂, 1 ♀: "Ban Saleui, 1350 m, Xamneua, Laos 21-24.VI.2003, M. Sato leg." (NMNS); 1 ♀: "Phou Pan, 1750 m, Xamneua, Laos 16-21.VI.2003, M. Sato leg." (NMNS).

Distribution: Vietnam, Laos (new record).

***Dicranopselaphus malickyi* Lee & Yang**

Dicranopselaphus malickyi Lee & Yang, 1996: 192

1 ♂, 3 ♀♀: "Vietnam, N; N of Hanoi, Sa Pa vii. Env., 1250 m NN Hoang Lien Son Nat. Park, 05.VI.-09.VI.1998, leg. A. Napo-lov" (NMEG).

Distribution: Thailand, Myanmar, Vietnam (new record).

***Ectopria iranensis* n. sp. (Figs 1-3)**

Holotype ♂: "S Iran, Kushk N. Masiri, 1800 m 12.6.1973 / Loc. no. 237 Exp. Nat. Mus. Praha" (NMPC).

Male. Length 3.3 mm, width 2.1 mm. Coloration brown; head darker blackish-brown, prosternum and proepisternum yellowish-

brown. Antennae lost. Maxillary palpus (Fig. 3) slender, terminal segment bifurcate, relative lengths of segments 2-4 about 2.2 : 1 : 1.7. Labial palpus (Fig. 2) small, about 0.5 times as long as maxillary palpus, segment 2 subequal to segment 3, terminal segment bifurcate. $WP/LP = 2.64$; $LE/WE = 1.21$; $WP/WE = 0.87$.

Aedeagus (Fig. 1) 4.4 times as long as wide. Penis long, 0.78 times total length of aedeagus, apex narrowly rounded, gradually narrowed toward apex. Parameres widest at middle, abruptly narrowed near base, lateral margin concave in apical third; mesal margin connected at middle. Fibula 0.3 times total length of aedeagus; Y-shaped.

E t y m o l o g y . This species is named for the type locality.

R e m a r k s . This species is characterized by its elongate aedeagus and by its bifurcate maxillary and labial palpi.

***Granuleubria pakistanica* Jäch & Lee**

Granuleubria pakistanica Jäch & Lee, 1994: 228; LEE & YANG 1999

3 ♂♂: "SE Iran, 1-2.4.1973 env. Sarbaz, valley of river Sarbaz / Loc. no. 145 Exped. Nat. Mus. Praha" (NMPC).

Distribution: Nepal, Pakistan, Iran (new record).

***Jaechanax insignis* (Fairmaire)**

Eubrianax insignis Fairmaire, 1904: 87

Jaechanax insignis (Fairmaire): LEE, SATÔ & YANG 2000b

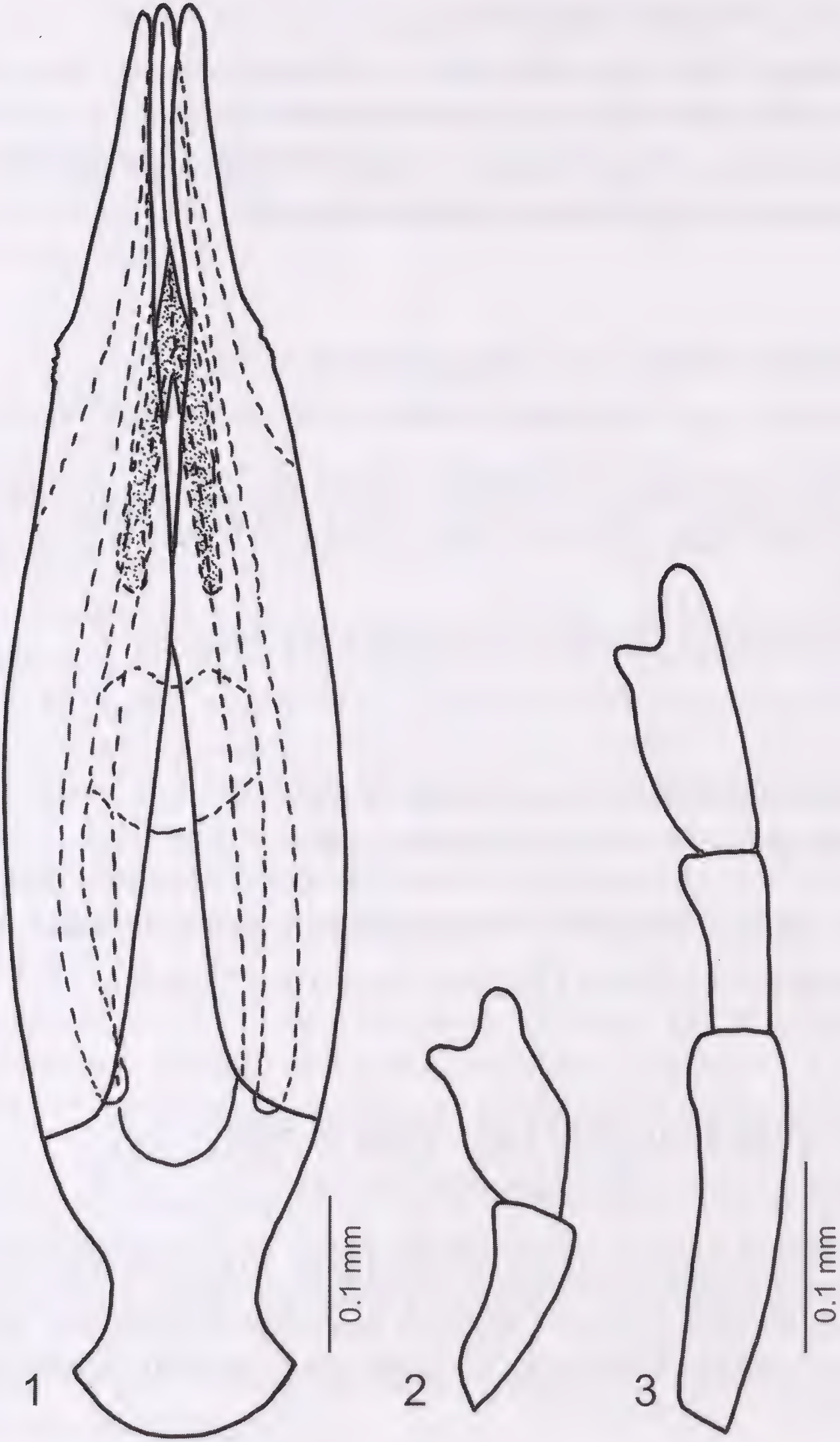
2 ♂♂: "Bang Phra Chong Buri Prov., E. Thailand, 18.V.2002, S. Tsuyuki leg." (NMNS).

Distribution: Vietnam, Laos, Myanmar, Thailand (new record).

***Jaechanax major major* (Pic)**

Eubrianax major Pic, 1913: 172

Jaechanax major (Pic): LEE, SATÔ & YANG 2000b



Figs 1-3: *Ectopria iranensis* n. sp., male. 1 - aedeagus; 2 - labial palpus; 3 - maxillary palpus.

1 ♂: “Nep[al], Narayan/Chitwan 13 km W Sauraha, Kasara, Chitwan-NP / 27°33'07"N, 84°21'59"E, 20.VI.2005, 180 m, leg. A. Weigel, dec. Forest” (NMEG).

Variation: this specimen has a yellowish-brown body, but the apical halves of the elytra are dark brown.

Distribution: Nepal (new record), Thailand, Malaysia, Indonesia (Sumatra, Java), Philippines (Mindanao).

***Macroebria bella* Lee, Yang & Satô**

Macroebria bella Lee, Yang & Satô, 1999: 190

1 ♀: “Vietnam, N. 100 km SSW Hanoi, 40 km SW Than Hoa, Ben En National Park, 50 m 23-28.VII.1997, lg. A. Napolov” (NMEG).

Distribution: Thailand, Vietnam (new record).

***Macroebria bicolor* Lee, Yang & Satô**

Macroebria bicolor Lee, Yang & Satô, 1997: 139

1 ♂: “Laos: Lakxao, 13-14.III.2005, leg. C.- F. Lee” (NMNS).

Distribution: China (Fujian), Laos (new record).

***Macroebria contracta* Lee, Yang & Satô**

Macroebria contracta Lee, Yang & Satô, 1999: 191

1 ♀: “Vietnam, N. 100 km SSW Hanoi, 40 km SW Than Hoa, Ben En National Park, 50 m, 23-28.VII.1997. leg. A. Napolov” (NMEG).

Distribution: Thailand, Vietnam (new record), Laos, Indonesia (Sumatra).

***Macroebria monstrosa* Lee, Yang & Satô**

Macroebria monstrosa Lee, Yang & Satô, 1999: 197

4 ♂♂: "Giava [Java], Tcibodas, Ott. 1874, O. Beccari" (MSNG);
1 ♂: "Urung Tama Sibolangit, E. Sumatra, 17-18.IX.1998, H. Takizawa leg." (NMNS); 1 ♂, same locality and collector, 26.X.1999 (NMNS).

Variation: all individuals from Java are brown and their penis is longer, reaching apex of parameres.

Distribution: East Malaysia (Sabah, Sarawak), Indonesia (Java, Sumatra: new records).

***Macroebria shimadai* n. sp.** (Figs 4-7)

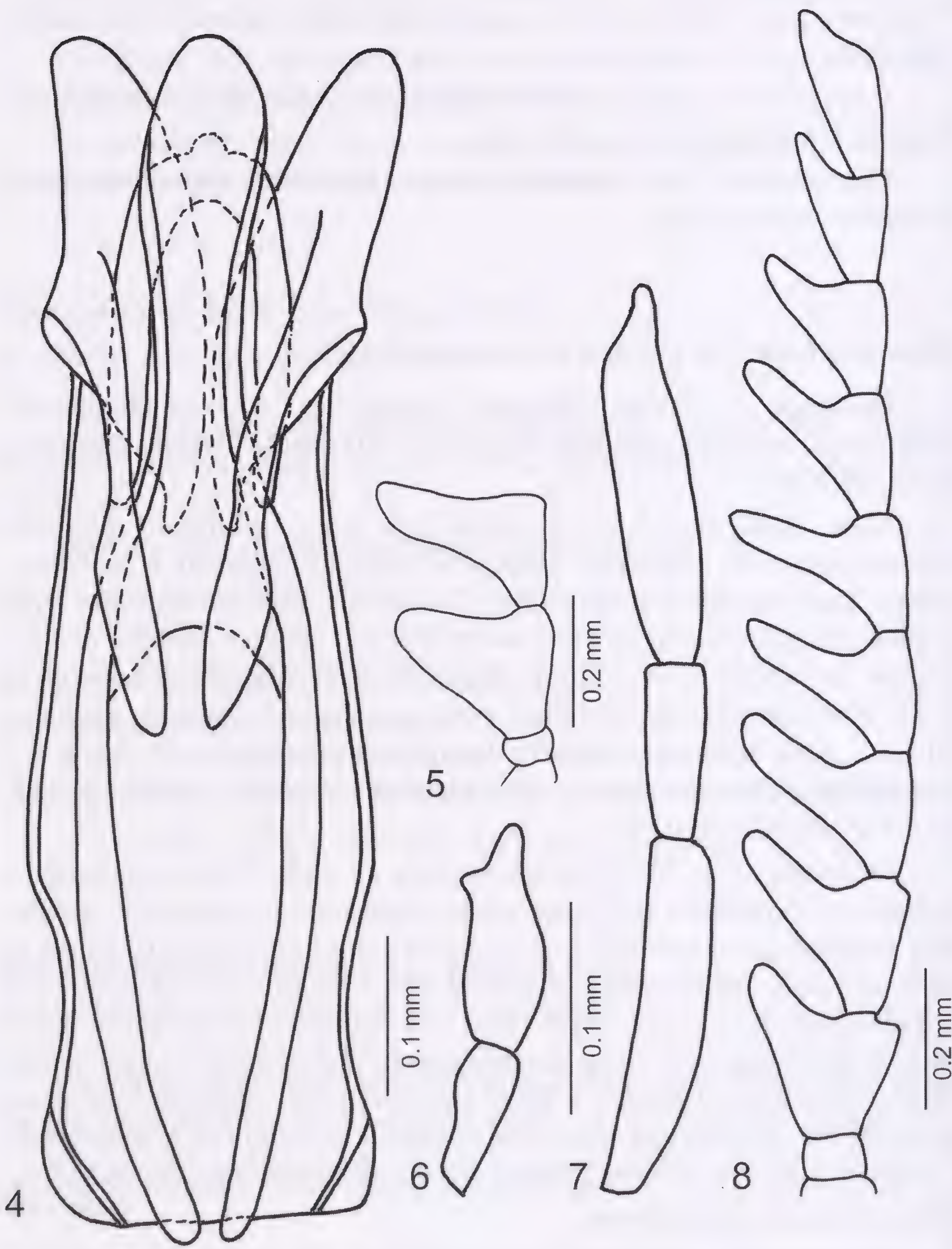
Holotype ♂: "[West Malaysia] Pahang St. Cameron Highlands, Robinson Waterfall (window trap) 12-15.III.2002, Takashi Shimada leg." (NMW).

Male. Length 2.8 mm, width 1.9 mm. Coloration blackish brown. Antennal segment 3 triangular (Fig. 5), segment 4 pectinate, others lost. Maxillary palpus (Fig. 7) slender, terminal segment with a tube-like process on apex of outer margin, relative lengths of segments 2-4 about 2.1 : 1 : 2.3. Labial palpus (Fig. 6) small, about 0.35 times as long as maxillary palpus; terminal segment medially dilated, apex bifurcate; relative lengths of segments 2-3 about 1 : 1.5. Striae pattern similar to *M. contracta*. $WP/LP = 2.55$; $LE/WE = 1.14$; $WP/WE = 0.74$.

Aedeagus (Fig. 4) 3.5 times as long as wide. Penis subequal to lengths of parameres and basal piece; narrowed at apical 2/5, gradually widened from apical 2/5 to 3/5, apex rounded. Fibula 0.3 times as long as penis, apical margin rounded with a small rounded process at middle; baso-lateral apophyses very long. Parameres wide, dorsal baso-lateral apophyses very long, reaching apical 1/3 of basal piece; ventral baso-lateral apophyses short. Basal piece gradually widened from apex to basal 1/3, moderately narrowed at basal 1/3, basal margin truncate.

E t y m o l o g y . This species is named after Takashi Shimada, who collected the holotype.

R e m a r k s : this species is similar to *M. bella* with regard to the maxillary and labial palpi, and aedeagus, but it differs from the latter by the blackish-brown color, the longer aedeagus, the wider parameres, and the rounded apex of the fibula.



Figs 4-8: *Macroebria shimadai* n. sp., male: 4 - aedeagus; 5 - antenna; 6 - labial palpus; 7 - maxillary palpus; *M. truncata*, male: 8 - antenna.

***Macroebria truncata* Lee, Yang & Satô**

Macroebria truncata Lee, Yang & Satô, 1999: 199

1 ♂: "Sibolangit, E. Sumatra, 26.X.1999, H. Takizawa leg." (NMNS).

Variation: in contrast to the serrate antennae of the holotype this specimen has pectinate antennae (Fig. 8).

Distribution: West Malaysia, Indonesia (Sumatra: new record).

***Odontanax laosensis* (Pic)**

Eubrianax laosensis Pic, 1923: 9

Odontanax laosensis (Pic): LEE, SATÔ & YANG 2000a

1 ♂, 1 ♀: "Nepal, Annapurna 1996, Sikles Mts. Garlang 1350 m, 18.4., Schmidt" (NMEG); 1 ♂: "Vietnam, N; N of Hanoi, SaPa vii. Env., 1250 m, NN Hoang Lien Son Nat. Park, 05.VI.-09.VI.1998, leg. A. Napolov" (NMEG); 1 ♂: "Vietnam, N, N of Hanoi, SaPa vii. Env., 1250 m NN Hoang Lien Son Nat. Park, 05.VI.-09.VI.1998, leg. A. Napolov" (NMEG).

Variation: one specimen from Vietnam has a brown body.

Distribution: Laos, Vietnam, India, Nepal (new record).

***Schinostethus (Sundodrupeus) priscus* Lee, Jäch & Yang**

Schinostethus (Sundodrupeus) priscus Lee, Jäch & Yang, 1998: 317

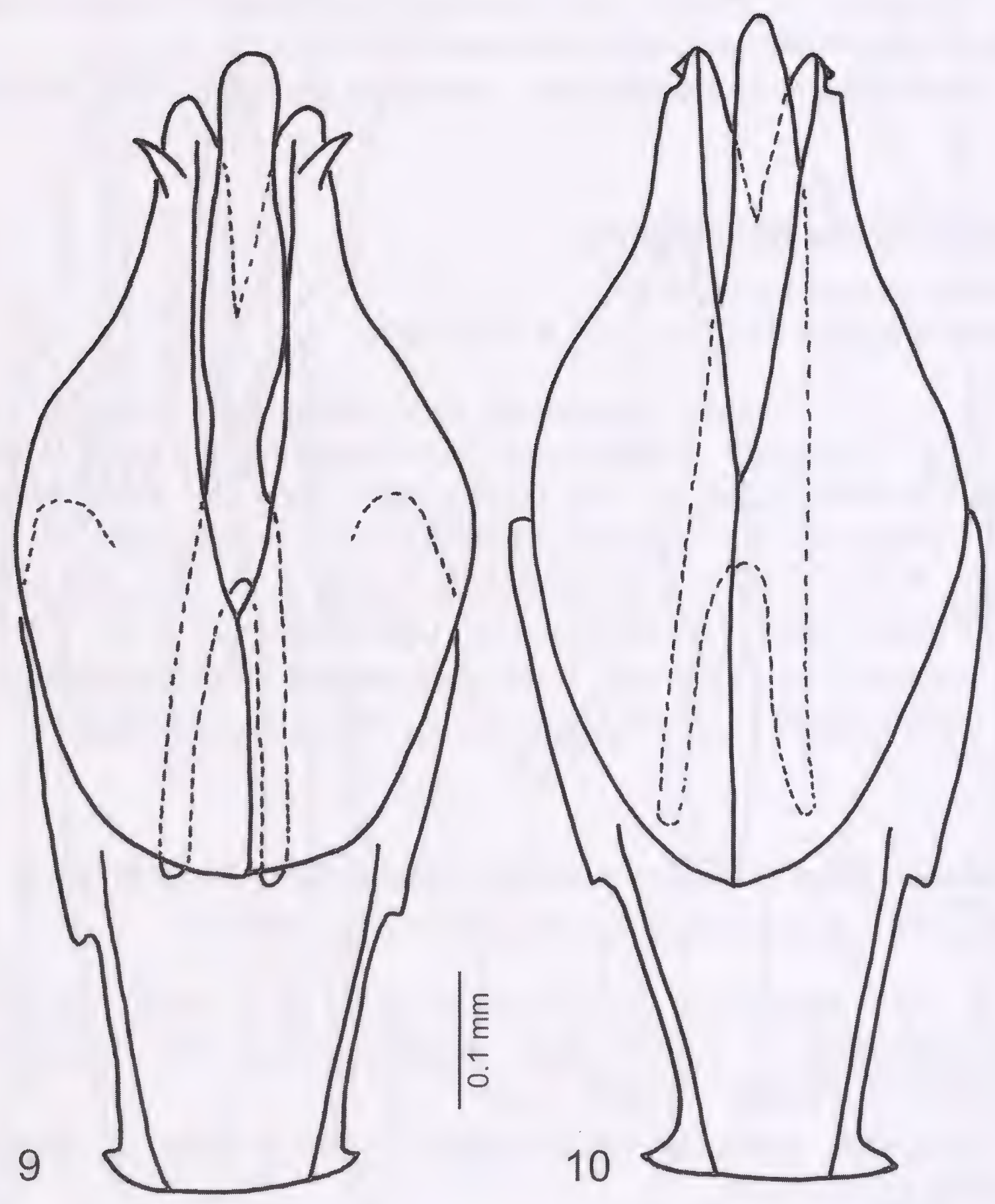
3 ♂♂: "Malaysia: Sabah Kerkot Laut, 18.VI.1999, leg. C.-F. Lee" (NMNS); 1 ♂: "Sarawak, Kuching dist., Mt. Serapi 27.-29.3.1994 J. Horák" (NMW).

Variation: medio-lateral parameral process varies in size and position (Figs 9-10).

Distribution: East Malaysia (Sabah, Sarawak: new record).

***Schinostethus (Sundodrupeus) sumatrensis* n. sp. (Figs 11-14)**

Holotype ♂: "Urung Tama, Sibolangit, E. Sumatra, 17-18.IX.1998, H. Takizawa leg." (NMW).



Figs 9-10: Variation of aedeagi of *Schinostethus (Sundodrupeus) priscus*.

Male. Length 3.1 mm; width 2.4 mm. Coloration dark brown, but eyes and antennae black. Relative lengths of rami of antennal segments 3-7 about 0.11 : 0.26 : 0.67 : 0.90 : 1 (Fig. 14). Maxillary palpus (Fig. 11) slender, terminal segment truncate, relative lengths of segments 2-4 about 3.0 : 1 : 1.9. Labial palpus (Fig. 12) small, about 0.5 times as long as maxillary palpus, segment 2 subequal to segment 3; apical margin irregular. $WP/LP = 2.61$; $LE/WE = 1.13$; $WP/WE = 0.74$.

Aedeagus (Fig. 13) 2.6 times as long as wide. Penis long, 0.85 times total length of aedeagus, apex rounded, gradually narrowed toward middle, abruptly widened behind middle. Parameres widest at connection with phallobase, slightly narrowed at apical 1/3; latero-apical processes broadly rounded, medio-apical processes widely connected with latero-apical process basally and laterally, apex curved and acute.

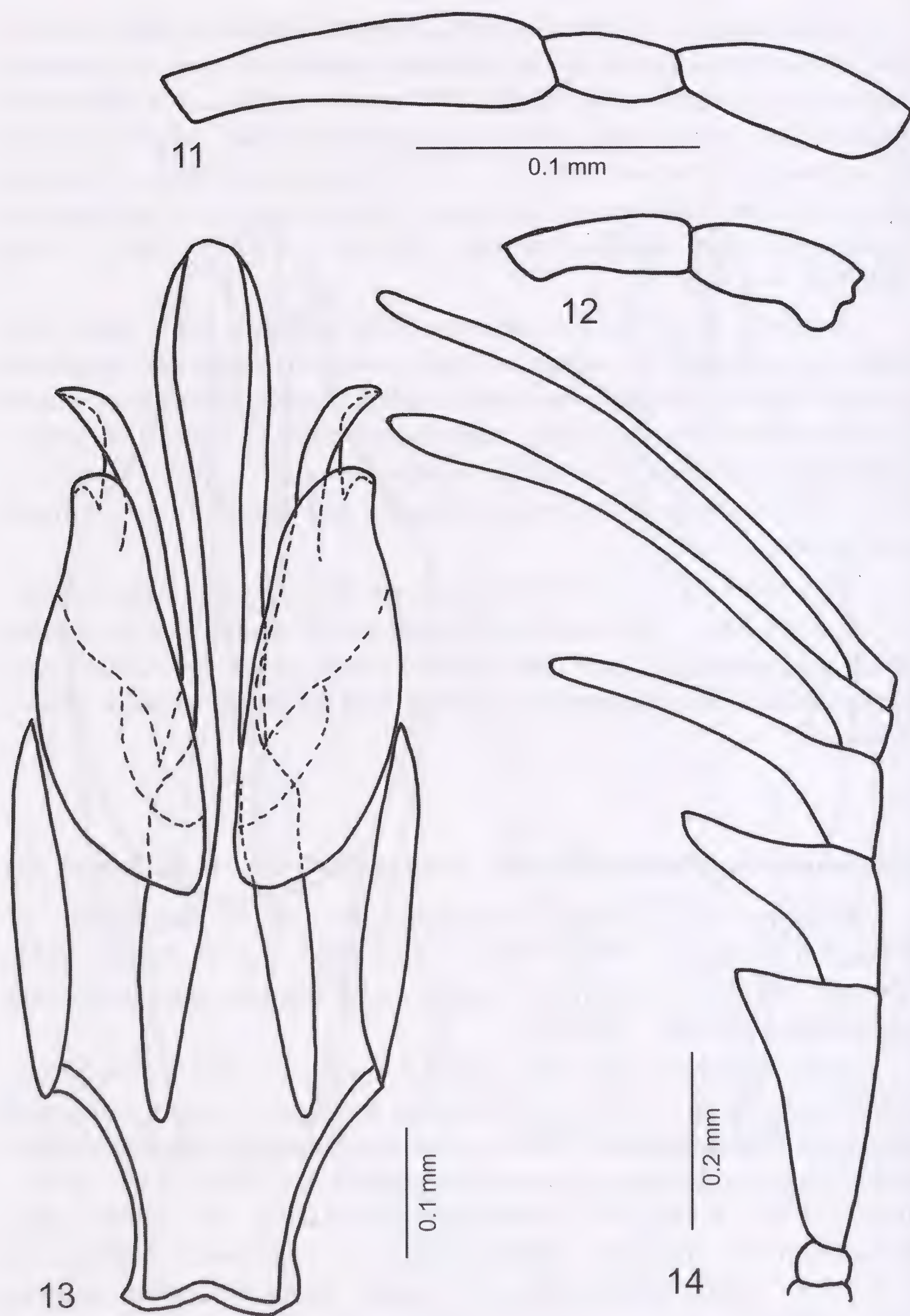
E t y m o l o g y . This species is named after the type locality.

R e m a r k s : this species is close to *S. sakaii* due to similar color and aedeagus, but differs by its long penis, by the unique articulation of the parameral processes, and by the short third antennomere.

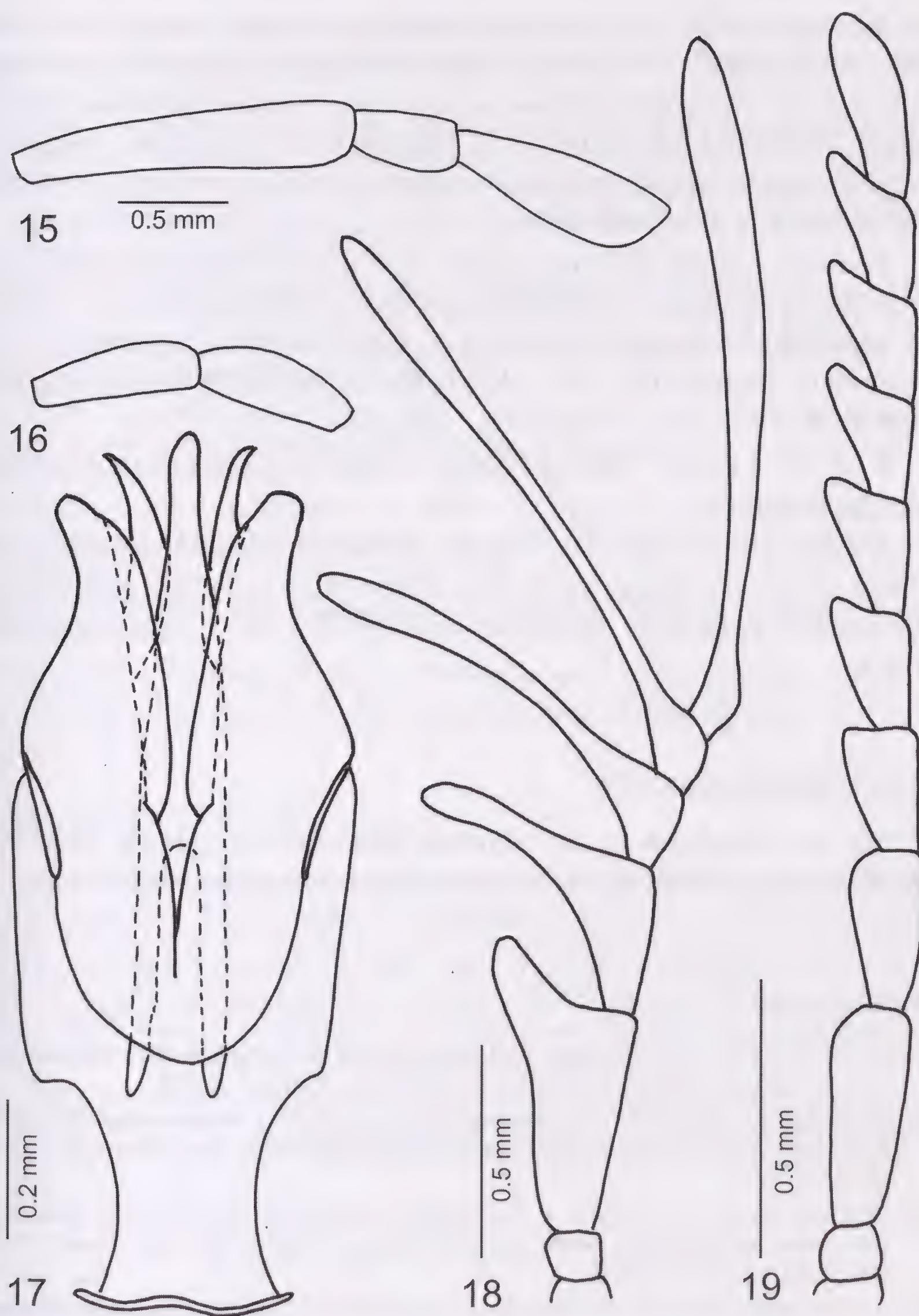
***Schinostethus (Sundodrupeus) transversus* n. sp.** (Figs 15-19)

Holotype ♂: "India: Uttaranchal 30 km N Bageshwar W Loharket [village] / 1800-1900 m, 24.VI.2003, leg. Z. Kejval & M. Tryzna" (NMW). Paratypes: 7 males and 2 females, same label data as holotype (NMW, NMNS).

Male: length 4.7-5.2 mm, width 3.1-3.4 mm. Coloration blackish-brown, except prothorax (including pronotum, prosternum, and proepisternum) yellowish brown, pronotum medially darkened. Relative lengths of rami of antennal segments 3-7 about 0.20 : 0.33 : 0.62 : 0.92 : 1 (Fig. 18). Maxillary palpus (Fig. 15) slender, terminal segment truncate, relative lengths of segments 2-4 about 3.2 : 1 : 2.1. Labial palpus (Fig. 16) small, about 0.5 times as long as maxillary palpus, segment 2 subequal to segment 3; terminal margin truncate. $WP/LP = 2.61-2.74$; $LE/WE = 1.13-1.16$; $WP/WE = 0.83-0.85$.



Figs 11-14: *Schinostethus* (*Sundodrupeus*) *sumatrensis* n. sp., male. 11 - maxillary palp; 12 - labial palp; 13 - aedeagus; 14 - antenna.



Figs 15-19: *Schinostethus (Sundodrupeus) transversus* n. sp. 15 - maxillary palpus; 16 - labial palpus; 17 - aedeagus; 18 - male antenna; 19 - female antenna.

Aedeagus (Fig. 17) 2.6 times as long as wide. Penis long, 0.76 times total length of aedeagus, apex rounded, gradually narrowed toward apex. Parameres widest at connection with phallobase, moderately narrowed at apical 1/3; latero-apical processes narrowly rounded, medio-apical process connected with latero-apical process basally, apex curved and acute.

Female. Length 5.8 mm, width 4.1 mm. Coloration similar to male, but black band on pronotum reduced to a small spot. Antennal segment 3 elongate, segment 4 feebly serrate, segments 5-10 moderately serrate (Fig. 19). $WP/LP = 2.69$; $LE/WE = 1.11$; $WP/WE = 0.78$.

Etymology: this species is named in reference to its transverse pronotum.

Remarks: this new species is similar to *Schinostethus flabellatus* in general appearance, but differs by its slender and curved latero-apical parameral processes and by the more transverse pronotum.

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We are indebted to M. Barclay (BMNH), J. Hájek (NMPC) and R. Poggi (MSNG) for sending valuable specimens in study.

REFERENCES

- FAIRMAIRE L., 1904 - Descriptions de Lamellicornes indo-chinois nouveaux ou peu connus - Mission Pavie Indochine (1879-1895), Paris, 3: 86-90.
- JÄCH M. & LEE C.-F., 1994 - Description of *Granuleubria*, a new genus of Eubriinae from West and South Asia (Coleoptera: Psephenidae) - *Kol. Rundsch.*, Wien, 64: 223-232.
- LEE C.-F. & YANG P.-S., 1996 - Taxonomic revision of the Oriental species of *Dicranopselaphus* Guérin-Méneville (Coleoptera: Psephenidae: Eubriinae) - *Ent. scand.*, Lund, 27: 169-196.
- LEE C.-F. & YANG P.-S., 1999 - Notes on *Granuleubria* Jäch and Lee, with descriptions of four new species and the immature stages of *G. fontana*, new species (Coleoptera: Psephenidae: Eubriinae) - *Col. Bull.*, Sacramento, 53: 259-274.
- LEE C.-F., JÄCH M. & YANG P.-S., 1998 - Psephenidae: II. Synopsis of *Schinostethus* Waterhouse, with descriptions of 14 new species (Coleoptera) (pp. 303-326), in: Jäch M. & Ji L. (eds.) - Water Beetles of China. Vol. II - Zool.-bot. Gesell. in Österreich and Wiener Coleopterologenverein, Wien, 371 pp.

- LEE C.-F., SATÔ M. & YANG P.-S., 2000a - A revision of the Eubrianacinae (Coleoptera, Psephenidae) IV. *Odontanax* gen. nov. - *Jap. Journ. syst. Ent.*, Matsuyama, 6: 151-170.
- LEE C.-F., SATÔ M. & YANG P.-S., 2000b - A revision of the Eubrianacinae (Coleoptera, Psephenidae) V. *Jaechanax* gen. nov. - *Elytra*, Tokyo, 28: 119-129.
- LEE C.-F., YANG P.-S. & SATÔ M., 1997 - The eastern Asian species of the genus *Macroeubria* Pic (Coleoptera, Psephenidae, Eubriinae) - *Jap. Journ. syst. Ent.*, Matsuyama, 3: 129-160.
- LEE C.-F., YANG P.-S. & SATÔ M., 1998 - Psephenidae: I. Notes on the East Asian species of *Ectopria* LeConte (pp. 297-301), in: Jäch M. & Ji L. (eds.) - Water Beetles of China. Vol. II - Zool.-bot. Gesell. in Österreich and Wiener Coleopterologenverein, Wien, 371 pp.
- LEE C.-F., YANG P.-S. & SATÔ M., 1999 - The southeast Asian species of the genus *Macroeubria* Pic (Coleoptera, Psephenidae, Eubriinae) - *Jap. Journ. syst. Ent.*, Matsuyama, 5: 181-201.
- LEE C.-F., YANG P.-S. & SATÔ M., 2000 - A synopsis of *Dicranopselaphus* (Coleoptera: Psephenidae, Eubriinae), with descriptions of nine new species - *Ent. Science*, Tokyo, 3: 557-568.
- PIC M., 1913 - Diagnoses de Dascillides et Cyphonids nouveaux - *Échange*, Moulis, 19: 171-173.
- PIC M., 1918 - Nouveautés diverses - *Mél. exot.-ent.*, Moulis, 29: 7-24.
- PIC M., 1923 - Nouveautés diverses - *Mél. exot.-ent.*, Moulis, 40: 3-32.

ABSTRACT

New distribution records are provided for the following species: *Dicranopselaphus brevicornis* Lee & Yang, *D. emmanueli* (Pic), *D. flavus* Lee & Yang, *D. imparis* Lee & Yang, *D. malickyi* Lee & Yang, *Granuleubria pakistanica* Jäch & Lee, *Jaechanax insignis* (Fairmaire), *J. major major* (Pic), *Macroeubria bella* Lee, Yang & Satô, *M. bicolor* Lee, Yang & Satô, *M. contracta* Lee, Yang & Satô, *M. monstrosa* Lee, Yang & Satô, *M. truncata* Lee, Yang & Satô, *Odontanax laosensis* (Pic) and *Schinostethus* (*Sundodrupeus*) *priscus* Lee, Jäch & Yang.

Four new species are described and illustrated: *Ectopria iranensis* n. sp., from Iran, *Macroeubria shimadai* n. sp., from Malaysia, *S.* (*Sundodrupeus*) *sumatrensis* n. sp., from Sumatra and *Schinostethus* (*Sundodrupeus*) *transversus* n. sp., from India.

RIASSUNTO

Nuove specie e nuovi reperti di Psephenidae dell'Asia (Coleoptera).

Si forniscono nuovi dati sulla distribuzione delle seguenti specie: *Dicranopselaphus brevicornis* Lee & Yang, *D. emmanueli* (Pic), *D. flavus* Lee & Yang, *D. imparis* Lee & Yang, *D. malickyi* Lee & Yang, *Granuleubria pakistanica* Jäch & Lee, *Jaechanax insignis* (Fairmaire), *J. major major* (Pic), *Macroeubria bella* Lee, Yang & Satô, *M. bicolor* Lee, Yang & Satô, *M. contracta* Lee, Yang & Satô, *M. monstrosa* Lee, Yang & Satô, *M. truncata* Lee, Yang & Satô, *Odontanax laosensis* (Pic) e *Schinostethus* (*Sundodrupeus*) *priscus* Lee, Jäch & Yang.

Sono inoltre descritte ed illustrate quattro nuove specie: *Ectopria iranensis* n. sp., dell'Iran, *Macroeubria shimadai* n. sp., della Malaysia, *S.* (*Sundodrupeus*) *sumatrensis* n. sp., di Sumatra and *Schinostethus* (*Sundodrupeus*) *transversus* n. sp., dell'India.

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SOUTH AMERICAN COCCINELLIDAE (COLEOPTERA),
PART XI: A SYSTEMATIC REVISION
OF HYPERASPIDINI (HYPERASPIDINAE)

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INTRODUCTION

This study continues the revision of South American Coccinellidae. Parts I-X dealt with a variety of taxa with particular emphasis on Coccidulinae and Scymninae. Here we begin to deal with the extensive list of taxa in Hyperaspidae, beginning with the tribe Hyperaspini.

Hyperaspidae are small, usually colorful, highly patterned lady beetles primarily Western Hemisphere in distribution. As such, they attracted the attention of early taxonomic researchers who created a great many specific names as well as some confusion in categories above the species level. MULSANT (1850) described several genera and subgenera of "Hyperaspiens" as well as many species. He divided his "Hyperaspiens" into several "Branches," two of which, "Hyperaspiars" and "Thalassiaires," contain the taxa herein dealt with. Mulsant's genus *Cleothera*, with two subgenera, *Cleothera* and *Cyra*, was distinguished from *Hyperaspis* Redtenbacher primarily by the presence of a basal pronotal line (*Hyperaspis*) or absence of a line (*Cleothera*). This character was an unfortunate choice because it is illusory or absolutely fails in many species. Mulsant himself described taxa in *Cleothera* that were actually *Hyperaspis*, and vice versa. CROTCH (1874) further muddled the picture by synonymizing *Cleo-*

thera under *Hyperaspis*. Subsequent authors either followed Mulsant or Crotch for generic assignments, creating a situation where correct generic assignments can be arrived at only by examination of type specimens.

CHAPIN (1966) was first to make sense of some generic categories by using genital and antennal characters not observed by earlier workers. EL ALI (1972) further clarified generic relationships, but it was DUVERGER (1989) who clarified distinctions between Brachiacanthini Mulsant and Hyperaspidini, providing a suite of characters for each taxon that allows accurate generic assignment. He used both male and female genitalic structures as well as an external character to distinguish the tribes.

Some genera of Hyperaspidini have been studied by Milléo and colleagues. *Tiphysa* Mulsant was placed in Hyperaspidini by DUVERGER (1989), but MILLÉO & ALMEIDA (2003) transferred it to Brachiacanthini. *Diazonema* Weise was revised by MILLÉO & ALMEIDA (2000) and *Thalassa* Mulsant was revised by MILLÉO *et al.* (2004). Three previously unrecognized genera are described herein.

BIOLOGY

Host records are not available for most South American species of Hyperaspidini. Data for North American species of *Hyperaspis* (GORDON 1985) indicate that scale insects of the Coccidae and Pseudococcidae are common prey, although aphids and other Homoptera have been recorded (<http://www.sel.barc.usda.gov/scalenet/query.htm>). Biological data for members of *Menoscelis* did not exist until ORIVEL *et al.* (2004) published on the biology of “*Thalassa saginata*” (*Menoscelis saginata*). They discovered that the larvae of this species develop inside colonies of the arboreal ant *Dolichoderus bidens* (L.), and are obligatory myrmecophiles. They also stated that a study of arboreal ant colonies did not reveal the presence of *M. saginata* in nests of other than ant species.

The list below is taken from literature sources and from label data. Host names have been verified or corrected using ScaleNet, a computerized database of scale names that can be accessed at: <http://www.sel.barc.usda.gov/scalenet/query.htm>.

Clypeaspis trilineata (Mulsant)

Pseudococcus calceolariae (Maskell) - SCHILDER & SCHILDER (1928)

Saccharicoccus sacchari (Cockerell) - SCHILDER & SCHILDER (1928)

Hyperaspis pseudodonzeli n. sp.

Orthezia insignis [*Insignorthesia insignis* (Browne)] - label data

Hyperaspis orthivora n. sp.

Orthezia sp. - label data

Hyperaspis onerata (Mulsant)

Orthezia sp. - label data

Phenacoccus sp. - label data

Pulvinaria sp. - label data

Hyperaspis festiva Mulsant

Sipha flava (Forbes) - SCHILDER & SCHILDER (1928)

Saccharicoccus sacchari (Cockerell) - SCHILDER & SCHILDER (1928)

Hyperaspis connectens (Thunberg)

Sipha flava (Forbes) - SCHILDER & SCHILDER (1928)

Temisvalvae notata (Mulsant)

Phenacoccus cassava ? - label data

Phenacoccus herreni Cox and Williams - label data

Temisvalvae quinquepustulata (F.) = *raynevali* (Mulsant)

Phenacoccus sp. - label data

Planococcus citri (Risso) - label data

Temisvalvae bromelicola (Sicard)

Pseudococcus bromeliae = *Dysmicoccus brevipes* (Cockerell) - SICARD (1925)

DIAGNOSTIC CHARACTERS

Principal morphological terms used in descriptions and keys are briefly explained to simplify key and description usage.

P u n c t a t i o n a n d s u r f a c e s c u l p t u r e . Relative size of punctures on head, thorax, and elytral and ventral surfaces

is often useful. Size and spacing of punctures on various structures are compared. Spacing of punctures is expressed as "separated by a diameter (of a puncture)," "separated by less than a diameter," etc. Color, particularly dorsal patterns, is a primary distinguishing character. Surface appearance varies from shiny to quite dull depending on degree of alutaceous sculpture.

Head. The clypeus is long or short, concealing the labrum or not, apically emarginate. The frons and clypeus are joined either abruptly (Fig. 1), or smoothly, obliquely (Fig. 11), and the inner eye margin is smoothly rounded, lacking an eye canthus projecting from frons onto inner margin of eye.

Prosternum. Prosternal carinae usually converge at some point from apex to base of prosternum, but usually do not reach the base before converging, creating a "stem" that reaches the base. In a few species the carinae are incomplete, not convergent, or absent.

Abdomen. Postcoxal line configuration is quite uniform, but the line may or may not extend to the posterior margin of the 1st abdominal sternum; it may be flattened medially along posterior margin or rounded; and the recurved apical portion varies in degree of anterior extension.

Male genitalia. Genital structure is important for identification of males. GORDON (1985) illustrated and defined genitalic parts in detail, and the most important structures are discussed here. Basal lobe: median projection of phallobase, serving as a siphonal guide; a simple structure, differing in length and shape. Parameres: paired lateral projections of phallobase serving to position and hold basal lobe in position during copulation. Phallobase: includes the basal piece, basal lobe and paramere of male genitalia. Siphon: sclerotized rod inserted through the basal lobe and into the female bursa copulatrix during copulation; corresponds to aedeagus or penis, differing in length, form of apex, and structure of basal capsule.

Female genitalia (Fig. 143). Two forms of genital plates occur in Hyperaspini: one is short, more or less transverse, as in *Hyperaspis* species, and the other long, slender, as in *Tenuisvalvae* species. The spermathecae are structurally unique within the Coccinellidae, making the homologies of component structures unclear. After discussion with N. Vandenberg (pers. comm.), it seems best to use a modified version of DOBZHANSKY's (1941) terminology. The

spermatheca is divided into a slender basal "tube" (basal unit) and a retort-shaped distal capsule united to the basal portion by a slender connecting duct. The basal unit is tube shaped, lacks a visible ramus, accessory gland is present (not shown in many illustrations), and is rounded apically, with an apical "beak" (chitinized appendix). The distal portion is more or less rounded, not noticeably sclerotized, and apparently devoid of distinguishing characters (see Fig. 143).

METHODS

Morphological structures, both external and internal, were discussed and illustrated by GORDON (1985). Most of the same terminology is followed here, and that publication should be consulted if clarification is needed. Genital techniques are discussed under "Dissection" below. Lectotype and paralectotype labels were affixed to specimens so designated throughout. Label data for all newly described taxa are transcribed exactly as they appear on the label. All locality records listed in the text were taken from specimens actually examined; published records were not accepted because a defining criteria at the species level, genitalia, were not examined by most previous authors.

Dissection. Both sexes should be dissected when examining *Hyperaspis* specimens. Specific techniques consist of softening a specimen in hot water, removing the abdomen, placing it in a dilute solution of potassium or sodium hydroxide until muscle and fat are removed, rinsing abdomen and genitalic structures in clear water, and placing cleaned structures in glycerine for examination. Genitalia may be stored in several ways, but here they were stored in glycerine microvials or mounted on a card attached to the donor specimen.

Type material. Type specimens have been examined for all specific taxa unless otherwise indicated. Detailed information is included under "Type locality" and "Remarks". The "Methods" sections in GORDON (1985, 1999) contain discussions of locality records and primary type depositories that are applicable here.

Collections. The following acronyms denote depositories for specimens used in this study: (BM) Natural History Museum, London; (CAS) California Academy of Sciences, San Francisco, California; (CCM) Claudio Canepari, Milan; (CDA) California Department of

Food and Agriculture; (CMP) Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; (CNC) Canadian National Collection, Ottawa, Ontario; (DEI) Deutsches Entomologisches Institut, Müncheberg; (DZUP) Universidade Federal do Paraná, Curitiba, Brazil; (GG) Guillermo González, Santiago, Chile; (MBR) Museo Argentino de Ciencias Naturales "Bernardo Rivadavia", Buenos Aires, Argentina; (MHNG) Muséum d'Histoire Naturelle, Geneva, Switzerland; (MNHL) Muséum d'Histoire Naturelle, Lyon, France; (MNHP) Muséum National d'Histoire Naturelle, Paris, France; (MHNS) Museo Nacional de Historia Natural, Santiago, Chile; (NHMV) Naturhistorisches Museum, Vienna, Austria; (MSNG) Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy; (NREA) Naturhistoriska Riksmuseum, Entomologiska Avdelningen, Stockholm, Sweden; (SMTD) Staatliches Museum für Tierkunde, Dresden, Germany; (UMZC) Cambridge University Museum, Cambridge, England; (USNM) U.S. National Museum of Natural History, Smithsonian Institution, Washington, DC; (ZMHB) Zoologisches Museum, Humboldt Universität, Berlin, Germany; (ZMMU) Zoological Museum of Moscow, Lomosov State University, Moscow, Russia; (ZMUC) Zoological Museum, University of Copenhagen, Denmark.

DISCUSSION OF TYPE MATERIALS

Most previously described species of Hyperaspidae were named by MULSANT in a series of publications. His 1850 treatment of the world Coccinellidae was the first, and remains the most significant publication in the annals of lady beetle systematic. In that work he listed material examined from many sources, both public and private, listing the species locality followed by the collection from which the specimens came, e.g., Collect. Dejean, Chevrolat, etc. Most of these collections have been preserved in present museum holdings, but a few cannot be located; hence species placements in Hyperaspini or Brachiacanthini are unknown or doubtful.

Types of species described by T. KIRSCH (1876, 1883), mostly from Peru, were previously presumed destroyed because an inquiry concerning the types, which was directed to Dresden (SMTD) 30 years ago, elicited that response. Helmut Fürsch, Passau, Ger-

many, informed us (pers. comm.) that at least some Kirsch types are present in Dresden. Subsequent communication with Olaf Jaeger (SMTD) confirmed this, and we have been able to examine most of the needed specimens. MULSANT (1870) described several species from the Bruck collection. Helmut Fürsch (pers. comm.) informed us that the Emil von Bruck collection had been in Bonn and was destroyed by bombing in 1944. Therefore, the identity of those species is questionable. Specimens from the Trobert collection cannot be traced in spite of numerous inquiries directed to museums. Specimens from the Melly collection also cannot be traced. In addition, some taxa whose type material should be in existing collections, as indicated by Mulsant, are simply not there. Following is a list of Hyperaspidae species for which type material has not been located. The Mulsant species are followed by the name of the original collection from which his specimens came.

Cleothera adhaerens Mulsant - Sallé

Cleothera cincta Kirsch - should be in the SMTD but not located there.

Cleothera collaris Mulsant - Buquet, Melly, should be in BM, but not located there.

Cleothera flavida Mulsant - Bruck

Cleothera florifera Vogel - should be in the ZMHB but not located there.

Cleothera gemellata Mulsant - Bruck

Cleothera gracilis Mulsant - Germar and Schaum, should be in the ZMHB but not located there.

Cleothera graminicola Mulsant - Trobert

Cleothera laqueata Mulsant - Bruck

Cleothera maisonii Mulsant - Bruck

Cleothera millieri Mulsant - Trobert

Cleothera ormanceayi Mulsant - Germar and Schaum, Trobert, should be in the ZMHB but not located there.

Cleothera ovatonotata Mulsant - Trobert

Cleothera pallax Mulsant - Sallé

Cleothera pedicata Mulsant - Bruck

Cleothera ponderosa Mulsant - Bruck

Cleothera pretiosa Mulsant - Bruck

Cleothera proserpinae Mulsant - Bruck

Cleothera puella Mulsant - Bruck

Cleothera punctum Mulsant - Chevrolat, should be in the UMZC but not located there.

Cleothera quadrina Mulsant - Deyrolle, should be in the UMZC but not located there.

Cleothera septenaria Mulsant - Bruck

Cleothera subparallela Mulsant - Bruck

Cleothera turbata Mulsant - Germar and Schaum, should be in the ZMHB but not located there.

Cleothera vaticina Mulsant - Bruck

Cleothera venalis Mulsant - Bruck

Hyperaspis vetusta Weise - Should be in the ZMHB but not located there.

Cleothera vexata Mulsant - Should be in the UMZC but not located there.

Lectotypes for several species are designated herein to stabilize the current classification for future researchers.

LIST OF SOUTH AMERICAN HYPERASPIDINI

Diazonema Mulsant

1. *hypocrita* (Mulsant)
2. *fallax* Weise
3. *pubescens* (Weise)
4. *cavifrons* Weise (not South American)
5. *boothi*, n. sp.
6. *murilloi*, n. sp.
7. *eccentrica*, n. sp.

Menoscelis Mulsant

1. *saginata* Mulsant
2. *insignis* Mulsant

Thalassa Mulsant

1. *pentaspilota* (Chevrolat)
2. *flaviceps* Mulsant (not South American)
3. *similaris* Mulsant
4. *glauca* (Mulsant)

5. *korschefskyi* Milléo, Almeida & Gordon

6. *montezumae* Mulsant (not South American)

Clypeaspis, n. gen.

1. *trilineata* (Mulsant)

Prognataspis, n. gen.

1. *surreptiva*, n. sp.

Peruaspis, n. gen.

1. *paprzyckii*, n. sp.

2. *hypocrita*, n. sp.

Hyperaspis Redtenbacher

Section I

donzeli group

1. *latitibia*, n. sp.

2. *donzeli* Mulsant

3. *matronata* Mulsant

4. *helveola*, n. sp.

chapini group

5. *scutifera* Mulsant

6. *imitatrix*, n. sp.

7. *chapini*, n. sp.

onerata group

8. *cracentis*, n. sp.

9. *operaria* (Mulsant)

10. *limbigera* (Mulsant)

11. *bisignata*, n. sp.

12. *camargoi*, n. sp.

13. *biguttata* Sicard

14. *cleida* Mulsant

15. *tayronensis*, n. sp.

16. *pseudodonzeli*, n. sp.

17. *orthivora*, n. sp.

18. *zonula*, n. sp.

19. *brethesi*, n. sp.

20. *rosariensis*, n. sp.

21. *siladesma*, n. sp.

22. *octonotata*, n. sp.

23. *campbelli*, n. sp.

- 24. *colombiensis*, n. sp.
- 25. *dissidens*, n. sp.
- 26. *uninotata*, n. sp.
- 27. *onerata* (Mulsant)
- 28. *bicruciata* (Mulsant)

joannae group

- 29. *joannae*, n. sp.
- 30. *albopunctata* Crotch
- 31. *apicaspis*, n. sp.
- 32. *delicata* Almeida & Vitorino
- 33. *mimica*, n. sp.
- 34. *laterimacula*, n. sp.

howdeni group

- 35. *howdeni*, n. sp.
- 36. *chocoi*, n. sp.
- 37. *atra*, n. sp.
- 38. *recordata* Mulsant

Species not assigned to a group

- 39. *eupaleoides* Crotch
- 40. *mariposa*, n. sp.
- 41. *simlaensis*, n. sp.
- 42. *lindae*, n. sp.

Species known only from females

- 43. *c-nigrum* Mulsant
- 44. *sagittata* Crotch
- 45. *guilloryi* (Mulsant)
- 46. *pseudopavida*, n. sp.
- 47. *istmina*, n. sp.
- 48. *satipoensis*, n. sp.
- 49. *abertha*, n. sp.
- 50. *circumclusa*, n. sp.
- 51. *aemulata*, n. sp.
- 52. *dispar*, n. sp.
- 53. *histrionica* (Mulsant)

Section II

vredenburgi group

- 54. *ayacucho*, n. sp.
- 55. *herrerai*, n. sp.

- 56. *vredenburgi*, n. sp.
- 57. *festiva* Mulsant
- 58. *germainii* Crotch
- 59. *connectens* (Thunberg)

conclusa group

- 60. *ingrata* Mulsant
- 61. *funesta* (Germain)
- 62. *nana* Mader
- 63. *sphaeroides* Mulsant
- 64. *conclusa* Weise
- 65. *arida*, n. sp.
- 66. *elegantissima* Brèthes
- 67. *longula* Weise
- 68. *prolata*, n. sp.

Tenuisvalvae Duverger

- 1. *unipunctata* (Crotch)
- 2. *peregrina* (Mulsant)
- 3. *deyrollei* (Crotch)
- 4. *notata* (Mulsant)
- 5. *bisquinquepustulata* (F.)
- 6. *ecoffeti* (Mulsant)
- 7. *parenthesis*, n. sp.
- 8. *caucaensis*, n. sp.
- 9. *bromelicola* (Sicard)
- 10. *gnoma*, n. sp.

SYSTEMATICS

Hyperaspidini Brèthes, 1923

Hyperaspidini: Brèthes, 1923: 454; WINGO 1952: 17; DUVERGER 2001: 222; VANDENBERG 2002: 383; DUVERGER 2003: 67.

Hyperaspidina Jacobson, 1916: 969.

Hyperaspini Costa, 1849: 9; WEISE 1885: 5; CHAPIN 1966: 278; GORDON 1985: 352; DUVERGER 1989: 146.

Description. Hyperaspidinae of small to medium size; form ranges from elongate oval, depressed, to rounded, convex. Dorsal surface glabrous except *Blaisdelliana* Gordon. Antenna short, with 9 to 11 articles; club elongate, fusiform, apical article small, re-

cessed in preceding article; antennal insertion exposed or concealed. Eye large, entire, not emarginated by an eye canthus (Figs. 7, 11), finely faceted, without pubescence. Maxillary palpus with apical segment securiform. Scutellum usually large. Epipleuron narrow, usually excavated for reception of femoral apices except *Hyperaspidius* Crotch and *Blaisdelliana*. Leg short; femur grooved or flattened for reception of tibia; protibia slender, unmodified, or expanded; tarsus cryptotetramerous; claws toothed or not. Abdomen without gland openings, with 6 visible sterna. Male genitalia with basal lobe asymmetrical, toothed, lobe rooted in phallobase (Figs. 75, 80). Female spermatheca compound, basal unit and apical portion connected by a short or long duct (Fig. 108); genital plate basically transverse (Fig. 108), or long, slender, stylus reduced or absent (Fig. 494).

R e m a r k s . Eight South American genera are recognized as belonging to Hyperaspidini: *Hyperaspis* Chevrolat, *Tenuisvalvae* Duvrger, *Thalassa* Mulsant, *Menoscelis* Mulsant, *Diazonema* Mulsant, *Clypeaspis*, new genus, *Prognataspis*, new genus, and *Peruaspis*, new genus. SICARD (1912) described *Helesius caseyi* from Colombia, but examination of a syntype of that species revealed that it is a member of *Cyra*. Therefore, *Helesius* is not currently known from South America.

Of Hyperaspidine genera, *Hyperaspis* contains by far the greater number of species and comprises the bulk of this study. *Hyperaspis*, *Tenuisvalvae*, *Menoscelis*, and *Diazonema* are completely revised, and *Clypeaspis*, *Prognataspis*, and *Peruaspis* newly described. *Thalassa* was treated by MILLÉO *et al.* (2004); therefore we provide only species key and new information.

Diazonema and *Clypeaspis* have 9 or 10-articled antennae with antennal bases concealed beneath the eye canthus, and strongly modified protibiae. *Thalassa*, *Menoscelis*, *Peruaspis*, *Hyperaspis*, and *Tenuisvalvae* have 10 or 11-articled antennae with antennal bases partially concealed and protibia unmodified or weakly modified in the latter three genera.

MULSANT's original (1850) classification of these taxa was sporadically altered by subsequent authors such as CROTCH (1874) and CHAPUIS (1876). Our investigations, for the most part, confirm Mulsant's original arrangement of taxa conceived more than 150 years ago.

Hyperaspidini and Brachiacanthini are distinguished by both external and genital characters. Hyperaspidini are distinguished by the

lack of an eye canthus, inner margin of eye smoothly rounded (this is an excellent character by which specimens are quickly distinguished from brachiacanthines); presence of a fine, basal pronotal line, and basomedian projection of pronotum truncate (not dependable characters). Male genitalia have parameres rooted inside basal piece. Female spermathecae are compound, lacking infundibulum and visible ramus, with a basal unit separated from apical portion by a duct.

Brachiacanthini are distinguished by having an eye canthus of varying size and shape extended from frons onto inner margin of eye, emarginate eye (R. Booth, pers. comm.); without basal pronotal line, basomedian projection of pronotum not truncate. Male genitalia with parameres attached to outer portion of basal piece (as typical for most Coccinellidae). Female genitalia of typical coccinellid type with single spermathecal capsule composed of ramus, nodulus, and cornu; with distinct infundibulum.

KEY TO GENERA OF HYPERASPIDINI

- 1. Postcoxal line on basal abdominal sternum incomplete, of *Scymnobi* type (Fig. 37) *Menoscelis* Mulsant
- Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type (Fig. 66) 2
- 2(1). Labrum extended beyond clypeal apex, wide, apically truncate, dark brown, heavily sclerotized (Fig. 6); prosternal process prominent, raised (Figs. 4, 5) *Peruaspi*, n. gen.
- Labrum extended beyond clypeal apex or not, narrow, apically rounded, weakly sclerotized (Figs. 11, 12), yellow or pale brown; prosternal process not prominent (Figs. 10, 12) 3
- 3(2). Protibia angulate near base, posterior margin strongly flanged (Fig. 44) 4
- Protibia not angulate near base, flange on posterior margin present or absent 5
- 4(3). Antenna 9-articled (Fig. 25); frons on a distinctly higher plane than clypeus (Fig.13); ground color of elytron usually pale red (except *murilloi* and *eccentrica*) *Diazonema* Weise
- Antenna 11-articled (Fig. 43); frons on a slightly higher

plane than clypeus; ground color of elytron black, with bluish or greenish lustre *Thalassa* Mulsant

- 5(3). Eye large, approximately as wide as median frontal area when viewed from front (Fig. 53); protibia distinctly flanged; abdominal sterna 3-5 with pit on each side near lateral margin *Prognataspis*, n. gen.

Eye small, frontal area 2 to 3 times wider than eye when viewed from front (Fig. 1); protibia flanged or not; abdominal sterna 3-5 without pit on each sided 6

- 6(5). Body elongate, nearly parallel sided, dorsoventrally flattened (Fig. 47); protibia distinctly flanged, flange narrow at base, widened toward apex (Fig. 2) *Clypeaspis*, n. gen.

Body elongate or rounded, not parallel sided, dorsoventrally flattened or not; protibia not flanged or feebly so (Figs. 9, 74) 7

- 7(6). Female genital plate short, subquadrate (Fig. 97); female abdominal sternum 6 apically convex; antenna with 10 or 11 articles; ultimate maxillary palpal article truncate; mandibular retinaculum slightly curved, apex acute
 *Hyperaspis* Chevrolat

Female genital plate long, slender (Fig. 494); female abdominal sternum 6 apically triangular; antenna with 11 articles; ultimate maxillary palpal article slightly emarginate; mandibular retinaculum strongly curved, apex rounded *Tenuisvalvae* Duverger

Genus *Diazonema* Weise, 1926

Diazonema Weise, 1926: 12; KORSCHESKY 1931: 202; BLACKWELDER 1945: 448; CHAPIN 1966: 279; MILLÉO & ALMEIDA 2000: 66 (as synonym of *Corystes*).

Corystes Mulsant, 1850: 506 (not *Corystes* Latreille, 1802); CROTCH 1874: 208; CHAPUIS 1876: 249; KORSCHESKY 1932: 267; BLACKWELDER 1945: 448; MILLÉO & ALMEIDA 2000: 66 (not *Corystes* Latreille, 1802).

Corystes (*Diazonema*): DUVERGER 1989: 146.

Type species: of *Corystes*, *Corystes hypocrita* Mulsant, by monotypy; of *Diazonema*, *Diazonema cavifrons* Weise, by subsequent designation of KORSCHESKY (1932).

Description. Hyperaspidini with form rounded, convex. Dorsal surface glabrous or pubescent. Elytral ground color variable. Elytron maculate or not. Antenna with 9 articles, basal article wider than long (Figs. 25, 31); antennal insertion concealed. Apical maxillary article straight apically; mandibulary retinaculum strongly curved, apex rounded. Clypeus short, narrow, slightly extended beyond frons, on lower plane than frons, abruptly joined to frons, apically emarginate (Figs. 13, 15). Frons widely flared, concealing antennal base. Labrum concealed beneath clypeus. Scutellum large, wider than long. Elytral epipleuron wide, not medially grooved, descending externally, excavated for reception of middle and hind femoral apices. Prosternal process slightly convex, with 2 carinae convergent toward base. Legs with tibiae short. Protibia short, wide, flattened, tibial groove strongly flanged, outer margin of flange slightly sinuate, flange as wide at base as apex, angulate near base (Fig. 26); meso- and metatibia narrow, medially emarginate, not flanged, with distinct tibial groove, angulate near base. Posterior margin of metasternum abruptly descending between coxa and lateral margin. Metendosternite with deep, V-shaped anterior border. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type (Fig. 17). Male apical abdominal sternum weakly modified. Apex of female abdominal sternum 6 rounded. Female genital plate transverse.

Remarks. *Diazonema* (as *Corystes*) was revised by MILLÉO & ALMEIDA (2000), and that publication should be referred to for detailed discussions and illustrations. We do not entirely agree with their conclusions regarding species synonymy. Therefore, we have reinstated some species names as valid taxa. Male genitalia are extremely similar in all *Diazonema* species, suggesting that only a single taxa exists, but external characters such as pubescence or lack of pubescence, and type of prosternal process, indicate there are six valid species.

A single specimen from Nicaragua, in the Natural History Museum, London collections, was examined but not identified. It is most similar to *D. fallax* and *D. hypocrita* but differs from both. Because it is a single specimen lacking any positively definitive character, we label it only as "*Diazonema* sp." in the hope that additional specimens will be found to clarify its taxonomic position.

Diazonema is most similar morphologically to *Menoscelis* (see remarks under that genus); it differs from all other genera of Hypera-

spidinae by a combination of short clypeus, strongly expanded frons on a higher plane than the clypeus, concealing antennal bases, 9-articled antenna, and short, compressed protibia.

We thank Roger Booth for informing us that *Corystes* Mulsant, 1850 is preoccupied by *Corystes* Latreille, 1802. Therefore, *Diazonema* Weise, 1926 becomes the next available name for this group of species.

KEY TO SPECIES OF *DIAZONEMA*

1. Elytron reddish yellow, immaculate, or with black border on lateral margin 3
 - Elytral ground color black, maculate 2
- 2(1). Elytron with single, oval, yellow spot on apical declivity (Fig. 24) 6. *murilloi*, n. sp.
 - Elytron with 3 red and yellow spots 7. *eccentrica*, n. sp.
- 3(1). Dorsal surface pubescent, pubescence composed of very short hairs 3. *pubescens* (Weise)
 - Dorsal surface glabrous 4
- 4(2). Head with frons and clypeus deeply dished, frons on a much higher plane than clypeus, with pronounced horns; Central America or Ecuador 5
 - Head with frons and clypeus slightly depressed, frons on a slightly higher plane than clypeus; not known from Central America 6
- 5(4). Frontal horns apically angulate; ventral surface reddish brown; Central America 4. *cavifrons* Weise
 - Frontal horns apically acute, brown; ventral surface mostly dark brown; Ecuador (Fig. 14) 5. *boothi*, n. sp.
- 6(4). Prosternal process strongly narrowed basally, abruptly widened apically; elytral apex narrowly yellow; northeastern and eastern South America 1. *hypocrita* (Mulsant)
 - Prosternal process slightly narrowed basally, slightly wider apically; elytral apex broadly yellow; Andean South America 2. *fallax* Weise

1. *Diazonema hypocrita* (Mulsant, 1850), **n. comb.**

Corystes hypocrita Mulsant, 1850: 507; CROTCH 1874: 208; KORSCHESKY 1932: 267; GORDON 1987: 26; MILLÉO & ALMEIDA 2000: 71.

Corystes (Corystes) hypocrita: DUVERGER 1989: 146.

Type locality. Cayenne (French Guiana).

Description. ♂, length 4.0 mm, width 3.6 mm; body form round, convex. Dorsal surface glabrous; head dull, alutaceous; pronotum dull, alutaceous; elytron shiny. Color yellow except pronotum with 5 reddish yellow spots, median spot widely separated from anterior margin, funnel shaped, with base narrow in front of scutellum, apex wide, basal triangular spot laterad of scutellum, triangular median spot in lateral 1/2; elytron pale red with narrow, yellow border on lateral and apical margins (Fig. 16); pro-, meso- and metasterna brownish yellow; abdomen dark brown except outer 1/8 yellowish brown. Head punctures fine, separated by a diameter or less. Pronotal punctures fine, larger than on head, separated by a diameter or less; elytral punctures slightly larger than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures slightly larger than on elytron, sparse, nearly absent. Punctures on abdominal sterna slightly larger than on elytra, sparse medially on basal sternum, dense, separated by less than a diameter on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc shiny, impunctate. Clypeal apex narrow, deeply emarginate medially, not sinuate laterally, lateral angle abruptly rounded. Prosternum narrow, "pinched" at base, widened toward apex, sides straight, with carinae narrowly separated at apex, convergent toward base, extended 1/3 distance to basal sternal margin. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe 7/8 length of paramere, slender, sinuate, apex with one angle rounded, opposite angle acute; paramere slender, slightly widened to rounded apex in apical 1/2 (Fig. 18); siphon long, slender, evenly curved, basal capsule with inner arm short, abruptly recurved apically, outer arm absent, base of siphon knobbed (Figs. 19, 20).

♀. None examined.

Variation. Length 4.0 to 5.3 mm, width 3.6 to 4.8 mm.

Geographical distribution: Northeastern and eastern South America.

Specimens examined: 4. Brazil, "Amazons"; São Paulo; Surinam, "Cayenne", Uyttenboogaart (BM) (MHNL) (USNM).

R e m a r k s . *Diazonema hypocrita* seems to be an eastern South American taxa distinguished from other *Diazonema* species by key characters. It most nearly resembles the Peruvian *D. fallax*, but the dorsal punctures are finer and not as closely spaced as in *D. fallax*.

The lectotype designated here is in the Dejean collection and is labeled "Cayenne, Lacordaire."

2. *Diazonema fallax* Weise, 1926

Diazonema fallax Weise, 1926: 13; MILLÉO & ALMEIDA 2000: 71 (as synonym of *Corystes hypocrita*).

Type locality. Callanga, Peru (ZMHB), lectotype designated by MILLÉO & ALMEIDA (2000).

D e s c r i p t i o n . ♂, length 4.7 mm, width 4.4 mm; body form round, convex. Dorsal surface glabrous; head dull, alutaceous; pronotum alutaceous, shiny; elytron weakly alutaceous, shiny. Color yellow except pronotum with 5 reddish brown spots, median spot narrowly divided medially, forming triangular spot on each side, feebly connected to base by narrow stem, triangular, basolateral spot laterad of scutellum, indistinct median spot in lateral 1/2; elytron pale red with narrow, yellow border on lateral margin, border abruptly widened on apical margin; pro-, meso- and metasterna brownish yellow; abdomen dark brown except outer 1/8 yellowish brown. Head punctures fine, separated by less than a diameter. Pronotal punctures larger than on head, separated by less than a diameter; elytral punctures smaller than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures larger than on elytron, sparse medially, becoming coarser, separated by less than a diameter laterally. Punctures on abdominal sterna larger than on elytra, very coarse, somewhat dense medially on basal sternum, smaller, separated by less than a diameter on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, shiny, impunctate. Clypeal apex narrow, deeply emarginate medially, not sinuate laterally, lateral

angle abruptly rounded. Prosternum wide, slightly narrowed at base, slightly widened toward apex, sides weakly rounded, with carinae widely separated at apex, convergent toward base, extended nearly 1/2 distance to basal sternal margin. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe 7/8 length of paramere, slender, sinuate, apex with one angle rounded, opposite angle acute; paramere slender, slightly widened to rounded apex in apical 1/2; siphon long, slender, evenly curved, basal capsule with inner arm short, truncate apically, outer arm long, wide, apically knobbed.

♀. Similar to ♂ except apex of 6th abdominal sternum rounded. Genitalia with beak of basal unit apically rounded.

Variation. Length 4.5 to 4.7 mm, width 4.3 to 4.4 mm. Pronotal maculation may be indistinct, nearly invisible; elytral color pattern varies from that described above to forms with narrow to broadly black lateral elytral borders and mostly black epipleurae (Tingo Maria).

Geographical distribution: Peru.

Specimens examined: 10. Peru: Callanga; Sani Beni; Huanuco; Tingo Maria (CAS) (USNM) (ZMHB).

Remarks. *Diazonema fallax* was described from Peru, and all specimens examined have been from that country. This is apparently the species actually described by MILLÉO & ALMEIDA (2000) as *D. hypocrita* because the female genitalia agree with their illustration. It is distinguished from *D. hypocrita* by key characters as well as coarser, denser, dorsal and ventral punctation.

3. *Diazonema pubescens* (Weise, 1926), **n. comb.**

Corystes pubescens Weise, 1926: 34; KORSCHESKY 1932: 268; MILLÉO & ALMEIDA 2000: 71 (as synonym of *Corystes hypocrita*).

Type locality. Ecuador.

Description. ♀, length 5.5 mm, width 5.0 mm; body form round, convex. Dorsal surface entirely pubescent, pubescence short, golden, moderately dense; head and pronotum aluta-

ceous, slightly shiny; elytron shiny. Color yellow except head and pronotum dark yellow; elytron pale red with narrow, yellow border on lateral and apical margins; pro-, meso- and metasterna brownish yellow; abdomen reddish brown except outer 1/4 yellow. Head punctures coarse, separated by less than a diameter. Pronotal punctures smaller than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, becoming coarser, separated by less than a diameter laterally. Punctures on abdominal sternum larger than on elytra, coarse, sparse medially on basal sternum, smaller, separated by less than a diameter on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, shiny, finely, sparsely punctate. Clypeal apex wide, shallowly emarginate medially, sinuate laterally, lateral angle acute. Prosternum wide, slightly narrowed at base, slightly widened toward apex, sides straight, with carinae narrowly separated at apex, convergent toward base, extended nearly 1/2 distance to basal sternal margin. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, rounded along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with beak of basal unit of spermatheca having apical projection, projection apically truncate.

♂. Not known.

Variation. None observed.

Geographical distribution: Ecuador and Peru.

Specimens examined: 4. Ecuador: Province Loja, Zamora; Peru: Junin, Chanchamayo, 1300 m (BM) (USNM) (NREA: holotype).

Remarks. This species is easily recognized by the unique dorsal pubescence, laterally sinuate clypeal apex, and pronotal punctures smaller than head punctures. Males were not available for examination; therefore male genitalia could not be comparatively assessed.

4. *Diazonema cavifrons* (Weise, 1903), **n. comb.**

Corystes cavifrons Weise, 1903: 208; MILLÉO & ALMEIDA 2000: 71 (as synonym of *Corystes hypocrita*).

Diazonema cavifrons: WEISE 1926: 12; KORSCHESKY 1931: 202.

Corystes (Diazonema) cavifrons: DUVERGER 1989: 146.

Type locality. Turrialba, Costa Rica (ZMHB) (lectotype designated by MILLÉO & ALMEIDA 2000).

Description. ♂, length 4.5 mm, width 4.0 mm; body form rounded, widest anterior to middle of elytra, convex. Dorsal surface glabrous; head slightly alutaceous, shiny; pronotum slightly alutaceous, shiny; elytron shiny. Color pale yellowish brown except head yellow with outer margins of frontal horns and clypeal apex light brown; pronotum with lateral 1/3 yellow, median 1/3 yellowish brown with oval, yellow spot near base on each side of middle; elytron with lateral margin slightly darker brown; propleuron, legs yellow. Head impunctate. Pronotal punctures fine, separated by less than to 3 times a diameter; elytral punctures smaller than pronotal punctures, separated by less than to 3 times a diameter. Metasternal punctures slightly larger than on elytron, sparse, widely separated. Punctures on abdominal sterna larger than on elytra, very coarse, somewhat dense medially on basal sternum, smaller, separated by less than a diameter on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, shiny, impunctate. Head triangularly depressed medially; clypeal apex narrow, emarginate medially, not sinuate laterally, lateral angle abruptly rounded; frontal horns greatly expanded, raised, tapered to acute apex. Prosternal process wide, pinched between coxae, widened toward apex, sides weakly rounded, with carinae widely separated at apex, convergent toward base, extended to apical margin of coxae. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, rounded along margin, apex strongly recurved toward basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum convex. Genitalia as described for *D. hypocrita*.

♀ Similar to male. Female genitalia as described for *D. pubescens*.

Variation. Length 4.5 to 4.0 mm. Frontal horns may be reduced in size, somewhat flattened; pronotum with median yellow spots sometimes indistinct.

Geographical distribution: Costa Rica.

Specimens examined: 6. Costa Rica, "Costa Rica"; Honduras, "Honduras" (BM) (ZMHB).

R e m a r k s . *Diazonema cavifrons* has the frontal area deeply dished as shown by the excellent photograph in MILLÉO & ALMEIDA (2000: p. 73, fig. 24), and the frons raised, forming "horns". This head structure differs from other *Diazonema* species except *D. boothi*. See remarks under that species.

5. *Diazonema boothi* n. sp.

Type material. Holotype ♂: Equador (sic), 52526, Buckley, *Corystes hypocrita* (handwritten), Fry Coll. 1905.100 (BM).

Description. ♂, length 5.2 mm, width 5.0 mm; body form round, convex (Fig. 21). Dorsal surface glabrous; head dull, alutaceous; pronotum alutaceous, dull; elytron shiny. Color yellow except head with outer margins of frontal horns and clypeal apex dark brown; pronotum with 5 indistinct brown spots, median spot narrowly divided medially, forming triangular spot on each side, feebly connected to base by narrow stem, triangular, basolateral spot laterad of scutellum; elytron pale reddish yellow, slightly paler toward lateral and apical borders (Fig. 21); pro-, meso- and metasterna dark brown, nearly black; mesoleg with trochanter, basal 2/3 of femur dark brown, metaleg with trochanter, basal 3/4 of femur dark brown; abdomen dark brown except basal sternum red medially, outer 1/4 of sterna 1-6 yellowish brown. Head punctures fine, separated by a diameter or less. Pronotal punctures slightly larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by less than to twice a diameter medially, becoming coarser, separated by less than a diameter laterally. Punctures on abdominal sterna larger than on elytra, very coarse, somewhat dense medially on basal sternum, smaller, separated by less than a diameter on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, shiny, impunctate. Head medially depressed; clypeal apex narrow, emarginate medially, not sinuate laterally, lateral angle abruptly rounded; frontal horns greatly expanded, raised, tapered to acute apex (Fig. 14). Prosternum wide, slightly narrowed at base, slightly widened toward apex, sides weakly rounded, with carinae widely separated at apex, convergent toward base, extended nearly 1/2 distance to basal

sternal margin. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex slightly recurved toward basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum convex. Genitalia with basal lobe 7/8 length of paramere, slender, sinuate, apex with one angle rounded, opposite angle acute; paramere slender, slightly widened to rounded apex in apical 1/2 (Fig. 22); siphon long, slender, evenly curved, basal capsule with inner arm short, truncate apically, outer arm long, wide (Fig. 23).

♀. Not known.

Etymology. This species is named for Roger Booth, a colleague who has contributed greatly to this and other coccinellid studies, both through loan of specimens and advice on numerous technical matters.

Remarks. *Diazonema boothi* (from Ecuador) resembles the Central American *Diazonema cavifrons*, but differs by having the head punctate; elytral punctures larger than pronotal punctures; metasternal punctures very large, dense; ventral surface mostly dark brown, nearly black; and postcoxal line on basal abdominal sternum flattened along apical sternal margin, apex slightly recurved toward basal margin. In *D. cavifrons* the head is impunctate; elytral punctures smaller than pronotal punctures; metasternal punctures small, sparse; ventral surface yellowish brown; and postcoxal line on basal abdominal sternum rounded along apical sternal margin, apex strongly recurved toward basal margin.

6. *Diazonema murilloi* n. sp.

Type material. Holotype ♂: Colombia, Val (Valle del Cauca), Rol-danillo, 966 m, 27.V.1939, Murillo No 5001 (USNM). Paratypes 4: 3, same data as holotype (USNM); 1, Colombia, Cnd (Cundinamarca), nr El Colegio, alt. 1600 m, 10.III.-'40, Murillo No 5363 (USNM).

Description. ♂, length 4.0 mm, width 3.6 mm; body round, convex. Dorsal surface with head alutaceous, shiny; pronotum and elytron slightly alutaceous, shiny. Color black except head yellow; pronotum with narrow apical margin and lateral 3/8 yellow; elytron with greenish sheen, 1 large, oval, yellow spot on apical declivity (Fig. 24); ventral surface reddish yellow except median area of

pro- and mesosternum, epipleuron black. Head punctures fine, separated by less than a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures slightly smaller than pronotal punctures, separated by a diameter or less. Metasternal punctures fine, sparse, nearly absent. Punctures on median area of basal abdominal sternum coarse, sparse, punctures on sterna 2-6 smaller than on basal sternum, separated by 1 to 3 times a diameter; area on 1st abdominal sternum inside postcoxal arc shiny, impunctate. Clypeal apex weakly emarginate, slightly sinuate laterally. Antenna with 9 articles (Fig. 25). Prosternum with intercoxal process narrow, pinched at base, widened apically, sides straight, carinae widely separated at extreme apex, abruptly narrowed toward base, forming long, apical stem, extended $\frac{3}{4}$ distance to basal sternal margin. Protibia short, wide, deeply grooved for reception of tarsus, posterior margin strongly flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, rounded along margin, apex recurved $\frac{1}{4}$ distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe $\frac{7}{8}$ length of paramere, slender, sinuate, apex with one angle rounded, opposite angle acute, small, angulate projection on one side; paramere slender, lateral margins parallel to apex (Fig. 27); siphon long, robust, evenly curved, basal capsule with inner arm short, truncate apically, outer arm absent, base of siphon knobbed (Fig. 28).

♀ Not known.

Variation. Length 4.0 to 4.3 mm, width 3.6 to 3.7 mm. The paratype from El Colegio has the elytral spot on apical declivity small, irregularly rounded, reddish yellow.

Etymology. This species is named for L. M. Murillo, a Colombian entomologist who collected this type series as well as many more Colombian Coccinellidae.

Remarks. This species and *D. eccentrica* are the only species of *Diazonema* with basically black elytra. *Diazonema murilloi* is the only species having prosternal carinae with a long basal stem.

7. *Diazonema eccentrica* n. sp.

Type material. Holotype ♀: Colombia, Vaupes, River Vaupes, x.xii.1952, D. J. Taylor. D402 B.W/. I. C.R.S. Expedition Colom-

bia, Pred. on coccid. D. 376. on cacao, Com. Inst. Ent. Coll. No. 13110, ?*Thalassa* sp., Det. R.D. Pope 1953 (BM).

Description. ♀, length 2.7 mm, width 2.3 mm; body form round, convex. Dorsal surface with head, pronotum, and elytron shiny. Color black, head with median, elongate brown spot on vertex and frons; pronotum with narrow anterior margin and lateral 1/4 yellow; elytron with 3 spots, 1 large median, pale red spot extended from near base to apical declivity, 1 small, elongate oval, yellow spot medially on lateral margin, 1 yellow spot on margin at apex (elytron damaged, extent of spot not determined) (Figs. 29, 30); ventral surface, including abdomen, yellow except pro-, meso- and metasterna yellowish brown. Head punctures fine, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures slightly larger than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures larger than on elytron, sparse medially, becoming denser laterally, separated by less than a diameter. Punctures on median area of basal abdominal sternum larger than on elytra, sparse, punctures fine, dense on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, weakly shiny, finely, sparsely punctate. Clypeal apex wide, deeply emarginate medially. Prosternum narrow, carinae narrowly separated at apex, convergent toward base, extended 4/5 distance to basal margin, not basally stemmed, not reaching basal margin of sternum. Postcoxal line on 1st abdominal sternum extended to posterior margin, flattened along margin, recurved 1/5 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum rounded. Genitalia of the *Hyperaspis* type with beak of basal unit elongate, wide; connecting duct long (Fig 32).

♂ Not known.

Etymology. The specific name is the Latin *eccentricus*, meaning different, odd, referring to the different appearance of this species compared to other species of *Diazonema*.

Remarks. Like *D. murilloi*, this species is an atypical member of *Diazonema* because of the black elytral ground color and distinct maculation. It is also the smallest species in the genus and has female genitalia of the *Hyperaspis* type. The holotype lacks the left elytron and apical portion of the right elytron.

Genus *Menoscelis* Mulsant, 1850

Menoscelis Mulsant, 1850: 508; CROTCH 1874: 209; CHAPIN 1966: 279; EL-ALI 1972: 23.

Menoscelis (*Thalassa*): CHAPUIS 1876: 228.

Thalassa (*Menoscelis*): KORSCHESKY 1931: 208; BLACKWELDER 1945: 449; DUVERGER 1989: 146.

Type species: *Menoscelis saginata*, by subsequent designation of CROTCH (1874).

Description. Hyperaspidini with form rounded, convex. Dorsal surface glabrous. Elytron maculate. Antenna with 11 articles, basal article wider than long (Fig. 36); antennal insertion concealed. Apical maxillary article straight apically; mandibular retinaculum strongly curved, apex rounded. Clypeus short, wide, on lower plane than frons, abruptly joined to frons, lateral angle abruptly rounded, apically emarginate. Frons flared, concealing antennal base. Labrum concealed beneath clypeus. Scutellum large, as wide as long. Elytral epipleuron wide, not medially grooved, obliquely descending externally, excavated for reception of middle and hind femoral apices. Prosternal process convex, with 2 carinae convergent toward base. Legs with tibiae long. Protibia narrow, flattened, medially emarginate, tibial groove deep, long, not or slightly flanged posteriorly, angulate near base (Fig. 38, 39); meso- and metatibia narrow, medially emarginate, not flanged, with shallow tibial groove. Posterior margin of metasternum abruptly descending between coxa and lateral margin. Metendosternite with deep, V-shaped anterior border. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnobi* type (Fig. 37). Male apical abdominal sternum weakly modified. Apex of female abdominal sternum 6 rounded. Female genital plate transverse.

Remarks. *Menoscelis* has been variously considered a valid genus or subgenus. MULSANT (1850) described it as a genus; CROTCH (1874) and CHAPIN (1966) followed suit. CHAPUIS (1876) considered it a genus with *Thalassa* a subgenus; KORSCHESKY (1931) reversed that opinion followed by DUVERGER (1989).

It is structurally most similar to *Thalassa* and *Diazonema*, but differs by the tibia long relative to femoral length, and a *Diomus* type of postcoxal abdominal line.

KEY TO SPECIES OF *MENOSCELIS*

1. Length 9.0 mm; elytron light reddish brown with 5 yellow spots (Fig. 33) 2. *insignis* Mulsant
- Length less than 6.0 mm; elytron yellow with 3 brown spots (Fig. 34) 1 *saginata* Mulsant

1. *Menoscelis saginata* Mulsant, 1850

Menoscelis saginata Mulsant, 1850: 508; CROTCH 1874: 209.

Menoscelis (*Thalassa*) *saginata*: CHAPUIS 1876: 228.

Thalassa (*Menoscelis*) *saginata*: KORSCHESKY 1931: 208; BLACKWELDER 1945: 449.

Thalassa (*Monoscelis* (sic!)) *saginata*: ORIVEL *et al.* 2004: 97 (biology).

Type locality. Cayenne (French Guiana) (MNHL, lectotype here designated).

Description. ♂, length 5.8 mm, width 5.2 mm; body form round, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum and elytron shiny. Color yellow except pronotum with H-shaped, median dark brown macula, macula with obliquely oval, yellow spot on each side of middle; elytron with 3 reddish brown spots, transversely rounded, 1 discal spot on sutural margin anterior to middle paired with spot on opposite elytron, forming large, transverse discal macula, 1 small spot on humeral callus, 1 small spot posterior to humeral callus near lateral margin (Figs. 34, 35); pro-, meso-, and apex of metasternum black. Head punctures coarse, separated by less than a diameter. Pronotal punctures smaller than on head, separated by less than to twice a diameter; elytral punctures slightly larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, sparse medially, separated by 1 to 2 times a diameter, becoming dense laterally, separated by a diameter or less. Punctures on median area of basal abdominal sternum larger than on elytra, sparse, punctures fine, dense on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, weakly shiny, finely, sparsely punctate. Clypeal apex wide, deeply emarginate medially. Prosternum narrow, carinae narrowly separated at apex, convergent, extended 1/2 distance to basal margin, basally

stemmed, stem long, reaching basal margin of sternum. Postcoxal line on 1st abdominal sternum joining posterior margin at lateral 1/3. Fifth sternum broadly, weakly emarginate apically; 6th sternum truncate. Genitalia with basal lobe 1/2 length of paramere, wide, sinuate, apex with one angle rounded, opposite angle acute, large, angulate projection on one side; paramere wide, slightly narrowed to rounded apex, inner margin sinuate (Fig. 40); siphon long, robust, evenly curved, basal capsule with inner arm short, truncate apically, outer arm shorter than inner arm, base of siphon sinuate (Fig. 41).

♀. Not known.

Variation. None observed.

Geographical distribution: French Guiana and Peru.

Specimens examined: 3. French Guiana: "Cayenne" (the lectotype). Peru: Satipo (MNHL) (USNM).

Remarks. As indicated in the key to species, *M. saginata* and *M. insignis* are radically different in size and dorsal coloration. CROTCH (1874) synonymized the two names stating that "*M. saginata* appears to me a pale variety of *insignis*, the quadrate common spot is identical in both, and all details of structure and punctuation." From that statement it is clear that Crotch had not seen a specimen of *M. insignis* nor read the original description. Mulsant's (1850) original description clearly defines the differences between *M. insignis* and *M. saginata*. KORSCHESKY (1931) listed *M. insignis* as an aberration of *M. saginata* and BLACKWELDER (1945) followed the same classification. This seemingly strange situation is perhaps explained by CROTCH's (1874) use of the name *insignis* for a species of *Hyperaspis* bearing a remarkable resemblance to *M. saginata*. KORSCHESKY (1931) inadvertently confused these two taxa in his catalogue of the Coccinellidae, a situation perpetuated by subsequent authors.

Only two specimens have been examined: the holotype from French Guiana and a specimen from Peru. In spite of the widely different geographic locations, the two specimens are identical in all respects.

The lectotype of *M. saginata* is here designated to stabilize future usage of this name. It is labeled "Cayenne, Lacordaire."

2. *Menoscelis insignis* Mulsant, 1850

Menoscelis insignis Mulsant, 1850: 509; CROTCH 1874: 209.

Menoscelis (*Thalassa*) *saginata*: CHAPUIS 1876: 228.

Thalassa (*Menoscelis*) *saginata* ab. *insignis*: KORSCHESKY 1931: 208; BLACKWELDER 1945: 449.

Type locality: Cayenne (French Guiana) (UMZC).

Description. ♀, length 7.5 mm, width 6.5 mm; body form round, convex. Dorsal surface with head alutaceous, dull; pronotum slightly alutaceous, shiny; elytron shiny. Color yellow except pronotum with median 1/3 reddish brown, reddish brown area with 3 yellow spots, 1 small, triangular, anteromedian spot, and 2 larger, oval basal spots; elytron reddish brown with 5 large yellow spots (Fig. 33), scutellar spot triangular, humeral spot c-shaped around humeral callus, discal spot obliquely transverse, posterolateral spot oval, and apical spot irregularly rounded. Head punctures fine, separated by less than a diameter. Pronotal punctures equal in size to head punctures, separated by a diameter or less; elytral punctures equal in size to head punctures, separated by a diameter or less. Metasternal punctures very coarse, much larger than on elytron, absent medially, dense laterally, separated by less than a diameter. Punctures on median area of basal abdominal sternum larger than on elytron, sparse, punctures fine, dense on sterna 2-6; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, weakly shiny, finely, sparsely punctate. Clypeal apex wide, weakly emarginate medially. Prosternum narrow, carinae narrowly separated in basal 2/4, widened apically between coxae. Postcoxal line on 1st abdominal sternum joining posterior margin at lateral 1/3. Fifth sternum truncate apically; 6th sternum apically arcuate.

♂ Not known.

Variation. None observed.

Geographical distribution: French Guiana.

Specimens examined: 1. The holotype specimen.

Remarks. See remarks under *M. saginata*. The ♀ type specimen examined is considered a holotype because it is clear from the original description that Mulsant had only one type specimen. The holotype is damaged and has been repaired at least once in its history; therefore, genitalia were not dissected because of possible further damage.

Genus *Thalassa* Mulsant, 1850

Thalassa Mulsant, 1850: 511; CROTCH 1874: 209; KORSCHESKY 1931: 208; BLACKWELDER 1945: 449; EL-ALI 1972: 32; MILLÉO *et al.* 2004: 395.

Type species: *Thalassa pentaspilota* Chevrolat, 1835, by subsequent designation of CROTCH 1874.

Description. Hyperaspidini with form rounded, convex. Dorsal surface glabrous, alutaceous, dull. Elytral ground color usually dark blue, or dark blue with greenish lustre. ♂ head mostly yellow, ♀ head black or reddish yellow with black maculation. Elytron maculate or not. Antenna with 11 articles, basal article wider than long (Fig. 43); antennal insertion concealed. Frons on a slightly higher plane than clypeus. Apical maxillary article slightly emarginate apically; mandibular retinaculum strongly curved, apex rounded. Clypeus long extended beyond frons, abruptly joined to frons, lateral angle abrupt near apex, emarginate apically (Fig. 42). Labrum short, narrow, weakly sclerotized, yellowish brown. Scutellum large, wider than long. Elytral epipleuron wide, not medially grooved, descending externally, excavated for reception of middle and hind femoral apices. Prosternal process flat, with 2 short, parallel carinae. Protibia wide, flattened, tibial groove strongly flanged, outer margin of flange sinuate, flange as wide at base as apex (Fig. 44); meso- and metatibia narrow, medially emarginate, not flanged (Figs. 45, 46). Posterior margin of metasternum abruptly descending between coxa and lateral margin. Metendosternite with deep, V-shaped anterior border. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type. ♂ apical abdominal sternum weakly modified. Apex of ♀ abdominal sternum 6 rounded. ♀ genital plate transverse.

Remarks. *Thalassa* was revised by MILLÉO *et al.* (2004). Therefore, we provide only a modified key to species and an annotated species list. See MILLÉO *et al.* (2004) for detailed descriptions and illustrations.

Thalassa is most similar morphologically to *Diazonema* but is distinguished by the 11-articled antenna, frons only slightly raised above clypeus, and long protibia.

KEY TO SPECIES OF *THALASSA*

- 1. Elytron maculate 2
- Elytron immaculate 4
- 2(1). Elytron with single yellow, apical spot.
- 1. *pentaspilota* (Chevrolat)
- Elytron with 1 or 2 yellow, discal spots. 3
- 3(2). Elytron with 2 yellow, discal spots. 5. *korschefskyi* Milléo *et al.*
- Elytron with single, quadrangular spot on disc
- 6. *montezumae* Mulsant
- 4(1). Pronotum with anterior and lateral margin narrowly dark yellow. 3. *similaris* Mulsant
- Pronotum with only lateral margin yellow. 5
- 5(4). Pronotum with lateral margin very narrowly yellow
- 2. *flaviceps* Mulsant
- Pronotum with lateral 1/4 yellow 4. *glauca* Mulsant

1. *Thalassa pentaspilota* (Chevrolat, 1835)

Chilocorus pentaspilotus Chevrolat, 1835: 124.
Thalassa pentastigma: Mulsant 1850: 512.
Thalassa pentaspilota: Crotch 1874: 209; Gordon 1987: 26; Milléo *et al.* 2004: 397.

Geographic distribution: Mexico and Venezuela. Blackwelder (1945) also lists Guatemala and Cuba; Guatemala is probably correct, Cuba probably incorrect.

South American specimens examined: 9. Venezuela: Aragua, Boca del Rio; Carabobo, Marciara; Carabobo, Yuma (USNM).

Remarks. This is an easily recognized species because of the single, apical yellow spot on each elytron. The distribution (Mexico and Venezuela) is very disjunctive, but an accidental introduction of live specimens from Mexico to Venezuela may be an explanation. Lectotype designated by Gordon (1987).

2. *Thalassa flaviceps* Mulsant, 1850

Thalassa flaviceps Mulsant, 1850: 513; MILLÉO *et al.* 2004: 397.

Thalassa prasina Mulsant, 1850: 516; CROTCH 1874: 209 (as synonym of *T. flaviceps*).

Geographic distribution: Cuba.

South American specimens examined: 1. Cuba, Havana (CAS).

3. *Thalassa similaris* Mulsant, 1850

Thalassa similaris Mulsant, 1850: 514; GORDON 1987: 26; MILLÉO *et al.* 2004: 398.

Geographic distribution: "New Grenada" (Colombia or Venezuela).

South American specimens examined: 2. The lectotype (GORDON 1987) labeled "n. gr.," meaning Colombia or Venezuela (UMZC); Guyana, Georgetown (BM).

Remarks. This species is easily distinguished from the similar *T. glauca* by the narrowly yellow pronotal borders.

4. *Thalassa glauca* (Mulsant, 1850)

Menoscelis glauca Mulsant, 1850: 510.

Thalassa glauca: CROTCH 1874: 510; MILLÉO *et al.* 2004: 399.

Geographic distribution: Guatemala and Costa Rica south to Colombia and Brazil.

South American specimens examined: 4. Brazil: São Paulo, Cantareira; Jaú.; Colombia: no locality (BM) (UMZC) (USNM).

Remarks. This is a widely distributed species whose distribution appears disjunct. The disjunction is probably not real, but an artifact of the scarcity of specimens in collections.

5. *Thalassa korschefskyi* (Milléo, Almeida & Gordon, 2004)

Hyperaspis korschefskyi Milléo, Almeida & Gordon, 2004: 399.

South American distribution: Colombia, no locality (holotype).

R e m a r k s . This species is known only from the holotype specimen (USNM).

6. *Thalassa montezumae* Mulsant, 1850

Thalassa montezumae Mulsant, 1850: 512; GORDON 1985: 400; MILLÉO *et al.* 2004: 398.

Geographic distribution: United States, Mexico, and Guatemala.

South American specimens examined: none.

Clypeaspis n. gen.

Type species: *Hyperaspis trilineata* Mulsant (by monotypy and present designation).

D e s c r i p t i o n . Hyperaspidini with form elongate, parallel sided, dorsum glabrous. ♂ head mostly yellow, ♀ head black or brown. Elytron maculate. Antenna with 10 articles, basal article wider than long; antennal insertion concealed. Apical maxillary article slightly emarginate apically; mandibular retinaculum strongly curved, apex rounded. Clypeus and frons joined at abrupt angle, clypeal apex emarginate; frons raised slightly above plane of clypeus, partially concealing antennal base (Fig. 1). Labrum short, narrow, weakly sclerotized, yellowish brown. Scutellum large, wider than long. Elytral epipleuron narrow, medially grooved, excavated for reception of middle and hind femoral apices. Prosternal process slightly raised, with 2 carinae (Fig. 3). Protibia wide, straight, not sinuate or emarginate, tarsal groove flanged on posterior margin (Fig. 2); meso- and metatibia wide, straight, slightly flanged on posterior margin. Posterior margin of metasternum abruptly descending between coxa and lateral margin. Metendosternite with anterior tendons of fork curved toward middle. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type. Male apical abdominal sternum weakly modified. Apex of female abdominal sternum 6 rounded. Female genital plate transverse.

Etymology. The generic name is a combination of the first part of "clypeus" and the ending of *Hyperaspis*, referring to the modified clypeus and relationship to *Hyperaspis*.

R e m a r k s . *Clypeaspis* belongs to the group that includes *Diazonema*, *Menoscelis*, and *Thalassa* because of the wide basal antennal segment, antennal insertion concealed beneath clypeus, and frons on a higher plane than clypeus. It is distinguished from these genera by the protibial flange narrow at the base, widened toward apex, tibia without basal angulation, and narrow epipleuron.

1. *Clypeaspis trilineata* (Mulsant, 1850), **n. comb.**

Hyperaspis trilineata Mulsant, 1850: 667; CROTCH 1874: 227; KORSCHESKY 1931: 198; GORDON 1987: 29.

Type locality. Cayenne (French Guiana).

D e s c r i p t i o n . ♂, length 3.4 mm, width 2.2 mm; body form elongate, parallel sided, flattened. Dorsal surface alutaceous, dull. Color reddish yellow except vertex of head black; pronotum with large, square, black basomedian spot in median 1/3; elytron with black vitta on sutural margin, vitta wide at base, narrowed to apical 1/8, wide, irregular black vitta extended from basal margin across humeral angle onto apical declivity, vitta slightly widened from base toward apex (Figs. 47, 48); venter of head, pro-, meso-, metasterna black; abdomen black except outer 1/3 and sterna 5-6 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures slightly larger than on elytron, nearly absent medially, larger, separated by a diameter near lateral margin. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, sparsely punctured. Clypeal apex deeply emarginate. Epipleuron oblique, grooved internally, slightly descending externally, femoral excavations deep. Prosternum with intercoxal carinae narrowly separated, parallel toward base, extended to basal 5/8, not stemmed, not reaching basal margin. Protibia

flanged, flange narrowest at base, becoming wider toward apex (Fig. 2). Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum truncate. Genitalia with basal lobe 1/2 length of paramere, obliquely rounded apically, with large, angulate projection on one side; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 49); siphon short, robust, apically straight, with membranous area, basal capsule with inner arm long, slender, outer arm wider, slightly longer than inner arm, base emarginate (Figs. 50, 51).

♀. Similar to male except head dark brown. Genitalia with beak of basal unit long, wide; connecting duct short (Fig. 52).

Variation. Length 2.8 to 3.7 mm, width 2.0 to 2.7 mm. Dorsal and ventral black areas often dark brown.

Geographical distribution: South America and Caribbean islands.

Specimens examined: 34. Argentina: Chaco, Dep. Resistencia; Salta, Oran. Brazil: Pará, Belém. British West Indies: Barbados. Venezuela: Aragua, El Limon; Caracas Valley, Los Ruices; Rio Yacuy Valley, Chivacoa; Suapure, Caura R (MBR) (USNM).

Remarks. The distribution pattern of this species, based on specimens examined, is somewhat odd. Nearly all specimens examined were collected on Barbados, with only a few from South America and none from Trinidad.

Type material could not be located. MULSANT (1850) stated that his specimen(s) were from the Buquet collection. Most material from that collection is in the BM, but specimens of *C. trilineata* could not be found.

***Prognataspis* n. gen.**

Type species: *Prognataspis surreptiva* n. sp.

Description. Hyperaspidini with form nearly round, dorsum glabrous. ♂ head yellow, ♀ head unknown. Elytron maculate. Antenna with 9 articles, basal article wider than long (missing from illustration) (Fig. 54); antennal insertion not concealed. Eye large, nearly as wide as median frontal area. Apical maxillary

article not emarginate apically. Frons narrow. Clypeus and frons joined at abrupt angle; clypeus narrow, clypeal apex emarginate; frons on same plane as clypeus, not concealing antennal base (Fig. 53). Labrum short, narrow, heavily sclerotized, brown. Scutellum large, wider than long. Elytral epipleuron broad, medially grooved, excavated for reception of middle and hind femoral apices. Prosternal process slightly raised, with 2 carinae (Fig. 55). Protibia wide, straight, not sinuate or emarginate, tarsal groove flanged on posterior margin (Fig. 57); meso- and metatibia narrow, straight, not flanged on posterior margin. Posterior margin of metasternum gradually descending between coxa and lateral margin. Abdominal sterna 3-5 with pit near lateral margin on each side. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type (Fig. 56). Male apical abdominal sternum 5 weakly modified.

Etymology. The generic name is a combination of the Latin *prognatus*, and the ending of *Hyperaspis*, referring to the unusually distinctive protruding mouthparts, and relationship to *Hyperaspis*.

Remarks. *Prognataspis* is characterized by the large eyes nearly as wide as median frontal area (usually the frontal area is two or three times as wide as eye); 9-articled antenna; very narrow clypeus and labrum; flanged protibia; and abdominal sterna 3-5 with pit on each side near lateral margin.

1. *Prognataspis surreptiva* n. sp.

Type material. Holotype ♂: Ecuador, 80 km NW Quito, 1300 m, PACTO, 26.2-2.3.2002, leg. Marek Halada (CCM).

Description. ♂, length 2.6 mm, width 2.4 mm; body nearly round, very convex. Dorsal surface shiny. Color black except head yellow; pronotum with lateral 1/3 and apical 1/4 yellow, elytron with single large, yellow spot medially in apical 1/2, spot tapered at apical and posterior ends (Figs. 61, 62); antenna, labial palpi, propleuron yellow; labrum dark brown; legs yellowish red except femora darker; epipleuron, pro-, meso-, and metasterna black; abdomen dark reddish brown. Head punctures fine, separated by less than diameter; pronotal punctures slightly larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, sepa-

rated by less than to twice a diameter. Metasternal punctures much larger than on elytron, nearly absent medially, becoming dense, contiguous near lateral margin. Punctures on basal abdominal sternum much than larger than on elytra, coarse, dense medially, becoming smaller, less dense laterally; sterna 2-6 with dense punctures becoming progressively smaller and denser from sternum 2 through sternum 6; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeus narrow, apex deeply emarginate, clypeus and frons joined at abrupt angle. Eye nearly as wide as median frontal area in frontal view. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward base, basally stemmed. Protibia wide, flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, rounded along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum deeply emarginate. Genitalia with basal lobe long, slightly shorter than paramere, apex irregularly rounded, with truncated projection on one margin; paramere slender, abruptly narrowed at basal 1/2, tapered from basal 1/3 to rounded apex (Fig. 58); siphon slender, long, apex sinuate, basal capsule with inner arm irregular, apically widened, slightly knobbed, outer arm shorter than inner, truncate apically (Figs. 59, 60).

♀ Not known.

Variation. None observed.

Etymology. The species name is from the Latin *surreptivus*, meaning false or fraudulent, referring to the deceptive resemblance to many *Hyperaspis* species.

Remarks. Generic characters readily identify this taxon, which otherwise looks very much like a *Hyperaspis* species.

***Peruaspis* n. gen.**

Type species: *Peruaspis paprzyckii* n. sp.

Description. Hyperaspidini with form elongate, rounded, dorsum glabrous. Elytron maculate. Antenna with 10 articles, basal article wider than long (Fig. 65). Clypeus short; frons and clypeus smoothly, obliquely joined, clypeal apex weakly emarginate; frons

on same plane as clypeus, partially concealing antennal base (Fig. 6). Labrum short, wide, strongly sclerotized (Figs. 4-6). Scutellum large, as wide as long. Elytral epipleuron narrow, flat, slightly grooved medially, excavated for reception of middle and hind femoral apices. Prosternal process raised, prominent, sides ridged (Figs. 5, 6). Protibia narrow, straight, slightly flanged on posterior margin (Fig. 70); meso- and metatibia narrow, straight, slightly flanged on posterior margin. Posterior margin of metasternum abruptly descending between coxa and lateral margin. Tarsal claw with basal tooth. Postcoxal line on basal abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type (Fig. 66). Apex of ♀ abdominal sternum 6 rounded. ♀ genital plate transverse.

Etymology. The generic name is a combination of "Peru" and the ending of *Hyperaspis*, referring to the country of origin of both known species.

Remarks. The labial and prosternal structures of this genus differ widely from those of other hyperaspine genera. The labrum is heavily sclerotized, wide, and extended beyond the clypeal apex. The prosternal process and middle of prosternum are prominently raised, particularly so in *P. paprzyckii*. Size difference and dorsal coloration between the 2 included species is extreme, but both share the diagnostic labial and prosternal characters.

♂♂ are unknown for either species. Both are Peruvian species, *P. paprzyckii* from a high altitude Andean locality, and *P. hypocrita* from low altitude on the eastern slope of the Andes.

KEY TO SPECIES OF *PERUASPIS*

1. Length less than 2.5 mm; color black, elytron with 2 yellow spots (Figs. 63, 64) 1. *paprzyckii*, n. sp.
- Length more than 3.0 mm; color mostly yellow with black maculae (Figs. 68, 69) 2. *hypocrita*, n. sp.

1. *Peruaspis paprzyckii* n. sp.

Type material. Holotype ♀: Peru, Satipo, XI, 1942, Paprzycki (USNM). Paratype: same data as holotype (USNM).

Description. ♀, length 2.1 mm, width 1.7 mm; body oval, convex. Dorsal surface shiny except head dull, alutaceous; pronotum and elytra shiny. Color black except head irregularly mottled with yellow across vertex and frons, clypeus brown; pronotum with lateral 1/3 yellow, inner margin of yellow area arcuate; elytron with 2 yellow spots, irregularly rounded spot at middle of elytron, and irregularly transverse subapical spot (Figs. 63, 64); antenna and labial palpi brownish yellow; narrow outer border of propleuron yellow; proleg yellowish brown, ventral surface dark brown. Head punctures distinct, separated by 1 to 2 times a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures as large as on elytron, separated by more than a diameter medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, impunctate. Clypeus short, apex slightly emarginate; labrum protruding anterior to clypeal apex, labrum heavily sclerotized, dark brown, shiny, apex slightly emarginate. Epipleuron flat, slightly grooved medially, slightly descending externally, femoral excavations deep. Antenna with 10 articles. Prosternum with intercoxal process raised, medially concave, with central carina. Protibia not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, rounded along margin, apex recurved 1/5 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate. Genitalia with beak of basal unit large, long; connecting duct short (Fig. 67).

♂. Not known.

Variation. Head of paratype entirely black.

Etymology. The species is named for the collector of the type series.

Remarks. *Peruaspsis paprzyckii* is a small, 2-spotted species similar to *Hyperaspsis bisignata* and *H. camargoi* in color pattern.

2. *Peruaspsis hypocrita* n. sp.

Type material. Holotype ♀: Peru, Madre de Dios, Tambopata Wildlife Res., 30 km SW Pto. (Puerto) Maldonado (sic !), 12 50'S, 69 20'W; 290 m, 6 XII 1982, Joseph J. Anderson (CMP).

Description. ♀, length 3.3 mm, width 2.7 mm; body rounded, slightly oval, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum shiny; elytra shiny. Color yellow except pronotum with large, black, obtriangular spot on each side of middle in basal 1/2; elytron narrowly bordered with black, with 3 black spots, 1 spot connected to suture anterior to middle, spot in conjunction with spot on opposite elytron forming large, cordate spot, 1 large, irregularly rounded spot on humeral callus, 1 large, irregularly rounded spot medially on apical declivity (Figs. 68, 69); venter of head, pro-, meso- and metasterna, femoral bases black; abdominal sterna 1-4 black except lateral 1/3 and sterna 5-6 yellow. Head punctures coarse, separated by less than a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, becoming dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming contiguous laterally, less coarse on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, nearly impunctate. Clypeus short, apex slightly emarginate; labrum protruding anterior to clypeal apex, labrum heavily sclerotized, black, shiny, apex slightly emarginate. Epipleuron oblique, slightly grooved internally, weakly descending externally, femoral depressions deep. Clypeal apex deeply emarginate. Protibia narrow, not flanged, with tarsal groove deep, basal end of groove projecting. Prosternum raised, with intercoxal carinae narrowly separated, parallel in apical 2/3, joined apically, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly rounded along margin, apex angled 1/4 distance to basal sternal margin. Fifth sternum with apex feebly emarginate. Genitalia with beak of basal unit long; connecting duct long (Fig. 71) (genital plates not shown).

♂ Not known.

Etymology. The specific name is the Latin *hypocrita*, meaning mime, player, referring to the resemblance to *Hyperaspis onerata*.

Remarks. *Peruaspis hypocrita* is a large species whose dorsal color pattern is similar to that of *H. onerata*.

Genus ***Hyperaspis*** Chevrolat in Dejean, 1833

Hyperaspis Chevrolat in Dejean, 1833: 435; MULSANT 1850: 649; CROTCH 1874: 224; KORSCHESKY 1931: 177

Type species: *Coccinella reppensis* Herbst, by subsequent designation of CROTCH 1874.

Gordoni Duverger, 2001: 226. (n. syn.)

Aliana Duverger, 2001: 226. (n. syn.)

Description. Hyperaspidini with form elongate, oval, or rounded, dorsoventrally flattened or convex; dorsum glabrous. Head usually yellow in male, at least partially brown or black in female. Elytron with pale maculation on dark background or dark maculation on pale background, rarely immaculate. Antenna with 10 or 11 articles (Figs. 92, 103, 136, 146, 170, 179, 194, 217, 223, 228, 238, 251, 257, 269, 287, 314, 321, 334, 341, 344, 349, 359, 363, 369, 375, 381, 397, 404, 413, 424, 441, 453, 467, 476, 483), basal article longer than wide; antennal insertion exposed. Apical maxillary article slightly emarginate apically; mandibular retinaculum strongly curved, apex rounded. Clypeus usually long, abruptly or obliquely, smoothly joined to frons laterally (Figs. 7, 11), distinctly emarginate apically, often concealing all or most of labrum. Labrum short, narrow (Figs. 11, 12), weakly sclerotized, yellow or yellowish brown. Scutellum large, wider than long. Elytral epipleuron narrow, usually medially grooved, excavated for reception of middle and hind femoral apices. Prosternal process usually slightly convex, with 2 carinae present (carinae completely absent in *H. dissidens*), carinae of varying lengths (Figs. 8, 10, 12, 77, 405) (Fig. 77, *H. reppensis*, type species). Protibia usually slender, rarely slightly flanged (Figs. 74, 121, 354). Posterior margin of metasternum abruptly descending between coxa and lateral margin. Metendosternite with anterior tendons of fork curved toward middle or not (Figs. 93, 104, 171, 195, 274, 364, 414, 425, 442, 484). Tarsal claw with or without basal tooth. Postcoxal line on first abdominal sternum incomplete, of *Scymnus* (*Scymnus*) type (Figs. 78, 122) (Fig. 78, *H. reppensis*, type species). ♂ apical abdominal sternum weakly modified. Apex of ♀ abdominal sternum 6 rounded. ♀ genitalia with coxal plate basically transverse (Fig. 97), rather than long, narrowly triangular as in *Tenuisvalvae* (Fig. 494).

Remarks. *Hyperaspis* is a Western Hemisphere genus with some Old World representatives. It is particularly prolific in North

America with 103 species and subspecies present (GORDON 1985). For South America we record 68 species of *Hyperaspis*, a number dwarfed by the large brachiacanthine genus *Cyra*.

Asymmetry in male genitalia is expressed by the basal lobe, which is usually apically obliquely truncate or rounded and, in ventral view, the right margin of the basal lobe is sinuate with a lateral projection. However, in *H. matronata*, the asymmetry is reversed; the left margin of the basal lobe is sinuate.

GORDON (1985) divided North American *Hyperaspis* into two Sections based on number of antennal articles, and also recorded a few ancillary characters for each Section that are not useful in the South American fauna. We divide South American *Hyperaspis* into two Sections defined by clypeal and frontal structures. Section I has the clypeus and frons joined at an abrupt angle (primitive character state), and contains five groups characterized by number of antennal articles and male genitalia. Section II has the clypeus and frons smoothly, obliquely joined (derived character state), and contains two groups characterized by male genital characters. These groupings are useful as identification aids, but also correspond with the assumption that 10-articled antenna is a primitive character state and 11-articled antenna a derived character state. However, *H. connectens*, which is clearly a member of Section II, has a 10-articled antenna. This divergence indicates that number of antennal articles is not a useful character for distinguishing genera. Within Section I, ♂ genitalia of the *H. onerata* group are considered primitive and those of the *H. howdeni* group are considered derived. In Section II members of the *H. conclusa* group have genitalia with long, slender, relatively unmodified basal lobes, which we consider a derived character state. Other derived character states of the *conclusa* group are dorsoventrally flattened body, moderately deep to shallow epipleural depressions, and elongate body.

Hyperaspis and *Tenuisvalvae* are distinguishable only in the female sex. Therefore, it is possible that some *Hyperaspis* species known only from males may belong in *Tenuisvalvae*.

Examination of the lectotype of *Cleothera micilla* Mulsant, 1853 (designated by GORDON 1987) revealed that it is a species of *Diomus* Mulsant (Scymninae, Diomini), and a junior synonym of *Diomus pallidipennis* (Mulsant, 1850).

Taxa of the brachiacanthine genus *Cyra* are numerous, and species are often confused with *Hyperaspis* species. DUVERGER (2001) correctly designated *Cyra loricata* Mulsant, 1850 the type species of *Cyra*. Mulsant originally described this species as *Cleothera* (*Cyra*) *loricata*. MULSANT (1850) described the genus *Cleothera* for a single species, *C. buqueti* Mulsant, 1850, which is actually a species of the previously described genus *Hinda* Mulsant, 1850, as recognized by WEISE (1895: 127). Thus, *Cleothera* is a junior synonym of *Hinda*, and *Cyra* becomes the correct generic name for those species described as *Cleothera* (*Cyra*) by MULSANT in 1850 and in subsequent publications.

DUVERGER (2001) described 3 American genera of Hyperaspidini as follows. *Clavatus* is a monotypic Mexican and Central American genus based on *Hyperaspis acanthicola* Chapin, 1966, a species associated with ants, which we consider valid. *Gordoni* is a monotypic North American genus based on *Hyperaspis significans* Casey, 1908, which we here place as a junior synonym of *Hyperaspis* because the only distinguishing character is the pubescent head. *Aliana* is a monotypic genus based on *Hyperaspis connectens* (Thunberg, 1808), that we also consider a junior synonym of *Hyperaspis* because the only distinguishing character is the sparsely pubescent clypeus. Both of the latter genera also have a 10-articled antenna, a character not considered of value at the generic level in *Hyperaspis* because it occurs in obviously dissimilar groups within the genus.

KEY TO SPECIES OF *HYPERASPIS*

- 1. Clypeus and frons joined at abrupt angle (Figs. 7, 8) 2
- Clypeus and frons smoothly, obliquely joined (Figs. 11, 12) 57
- 2(1). Species with pale elytral maculation (usually reddish or yellow spots) on dark background (Figs. 72, 79) 3
- Species with dark elytral maculation (usually brown or black spots) on pale background (Figs. 83, 213) 40
- 3(2). Species without yellow lateral border on elytron 8
- Species with yellow lateral border on elytron 4

- 4(3). Species without pale elytral spot, with yellow lateral border on elytron (Fig. 100). 5. *scutifera* Mulsant
Species with 1 or more discal spots on elytron, with yellow lateral border. 5
- 5(4). Species with 1 pale, discal spot on elytron and yellow lateral border. 7
Species with 2 or more pale, discal spots and yellow lateral border and. 6
- 6(5). Elytron with 2 pale discal spots (Fig. 134)
. 10. *limbigera* Mulsant
Elytron with 6 yellow spots (Fig. 366) 53. *histrionica* (Mulsant)
- 7(5). ♂ pronotum with lateral border of median black spot projected onto yellow lateral margin (Fig. 204); Brazil. . . .
. 21. *siladesma*, n. sp.
♂ pronotum with lateral border of median black spot straight (Fig. 100); Colombia, Curaçao, Venezuela. . . .
. 5. *scutifera* Mulsant
- 8(3). Elytron vittate 19. *brethesi*, n. sp.
Elytron not vittate, with variously shaped spots 9
- 9(8). Elytron with 1 pale, elytral macula 10
Elytron with more than 1 pale, elytral macula 20
- 10(9). Elytron with 1 yellow, humeral spot (Fig. 292) 37. *atra*, n. sp.
Elytron with pale macula not on humerus 11
- 11(10). Elytron with 1 yellow, apical spot (Fig. 273) 12
Elytron with yellow spot or pale macula not apical 15
- 12(11). Length more than 3.0 mm (Fig. 347) . . . 49. *abertha*, n. sp.
Length less than 2.5 mm 13
- 13(12). Prosternal carinae nearly parallel, not reaching basal prosternal margin 33. *mimica*, n.sp.
Prosternal carinae tapered from apex to base, reaching basal prosternal margin. 14

- 14(13). ♂ genitalia with basal lobe short, wide, with lateral angulation (Fig. 264) 31. *apicaspis*, n. sp.
 ♂ genitalia with basal lobe long, tapered from base to apex, without lateral projection (Fig. 270).
 32. *delicata* Almeida & Vitorino
- 15(11). Elytron with 1 yellow, discal spot 16
 Elytron with more than 1 yellow spot or pale macula . . 20
- 16(15). Length less than 2.0 mm; elytral spot irregularly rounded (Fig. 332). 45. *guilloryi* (Mulsant)
 Length more than 2.0 mm; elytral spot irregularly rounded or not 17
- 17(16). Elytron with spot large, narrow apically and widened posteriorly 18
 Elytron with spot small, oval or irregularly rounded . . 19
- 18(17). Elytron with anterior margin of spot reaching anterior border of elytron, outer margin of spot emarginate around humeral callus (Fig. 286). 36. *chocoi*, n. sp.
 Elytron with anterior margin of spot widely separated from anterior border of elytron, inner margin of spot widely emarginate on disc (Fig. 339). . . . 47. *istmina*, n. sp.
- 19(17). Elytron with spot regularly oval, reddish yellow (Fig. 113); Trinidad 7. *chapini*, n. sp.
 Elytron with spot irregularly rounded, yellow (Fig. 283); Colombia 45. *howdeni*, n. sp.
- 20(9). Elytron with 2 pale spots 21
 Elytron with more than 2 pale spots 28
- 21(20). Prosternal carinae completely absent (Fig. 9); discal spot transversely sinuate (Fig. 221) 25. *dissidens*, n. sp.
 Prosternal carinae present; discal spot not transversely sinuate 22
- 22(21). Elytron with 1 scutellar spot and 1 discal spot (Fig. 297) 38. *recordata* Mulsant

- Elytron with 1 discal and 1 apical spot 23
- 23(22). Elytron with apical spot transverse, yellow; median, black pronotal area strongly emarginated with yellow laterally (Fig. 153). 13. *biguttata* Sicard
- Elytron with apical spot rounded or slightly transverse, or if strongly transverse, then nearly white in color; median black pronotal area not emarginated with yellow laterally. 24
- 24(23). Length more than 2.6 mm; anterior tibia slightly flanged; antenna with 10 articles; Bolivia 1. *latitibia*, n. sp.
- Length less than 2.5 mm; anterior tibia not flanged; antenna with 11 articles; Argentina and Brazil 25
- 25(24). Elytron with transverse, nearly white, apical spot; discal spot small, about the diameter of an eye (Fig. 255) 30. *albopunctata* Crotch
- Elytron with rounded, yellow apical spot; discal spot much larger than an eye diameter 26
- 26(25). Elytron with discal spot large, median; discal and apical spots narrowly separated (Fig. 144) 12. *camargoi*, n. sp.
- Elytron with discal spot small anterior to middle; discal and apical spots widely separated. 27
- 27(26). Elytral surface smooth, polished; elytral punctures distinctly larger than pronotal punctures (Fig. 200). 20. *rosariensis*, n. sp.
- Elytral surface weakly alutaceous, slightly shiny; elytral punctures slightly larger than pronotal punctures (Fig. 138) 11. *bisignata*, n. sp.
- 28(20). Elytron with 3 yellow spots or maculae. 29
- Elytron with more than 3 spots or maculae 35
- 29(28). Pronotum with an oblique, yellow, basomedian spot on each side of middle; apical elytral spot c-shaped (Fig. 342) 48. *satipoensis*, n. sp.
- Pronotum without oblique basal spots; apical elytral spot c-shaped or not 30

- 30(29). Elytron with yellow scutellar spot (Fig. 336)
 46. *pseudopavida*, n. sp.
 Elytron without scutellar spot 31
- 31(30). Elytral spots small, the diameter of an eye or smaller
 (Fig. 119)..... 8. *cracentis*, n. sp.
 Elytral spots larger than an eye diameter 32
- 32(31). Pronotum mostly black; median spots on elytron nar-
 rowly connected (Fig. 244)..... 28. *bicrucata* (Mulsant)
 Pronotum mostly yellow; median spots on elytron usu-
 ally not connected..... 33
- 33(32). Pronotum yellow with pale brown maculae, or with
 large, yellow lateral area deeply emarginating median
 brown spot; antenna with 11 articles..... 34
 Pronotum yellow with large, rectangular, median black
 area (Fig. 79); antenna with 10 articles .. 2. *donzeli* Mulsant
- 34(33). All elytral spots large, narrowly separated or contigu-
 ous (Fig. 176); pronotum always yellow with pale brown
 maculae; apical spot on elytron large, c-shaped, occupy-
 ing most of apical declivity; 17. *orthivora*, n. sp.
 All elytral spots small, widely separated, not contiguous;
 pronotum occasionally yellow with pale brown maculae,
 usually with large, lateral yellow area deeply emarginat-
 ing median brown spot (Fig. 167); apical spot on elytron
 slightly c-shaped or not, occupying less than 1/2 of api-
 cal declivity 16. *pseudodonzeli*, n. sp.
- 35(28). Elytron with 4 yellow spots 36
 Elytron with more than 4 yellow spots 38
- 36(35). Elytron without scutellar spot (Fig. 249). 29. *joannae*, n. sp.
 Elytron with scutellar spot 37
- 37(36). Dorsal ground color black; pronotal and elytral punc-
 tures coarse; apical yellow spot on elytron transverse
 (Fig. 156)..... 14. *cleida* Mulsant

- Dorsal ground color dark brown; pronotal and elytral punctures fine; apical yellow spot on elytron c-shaped (Fig. 312). 41. *simlaensis*, n. sp.
- 38(35). Elytron with 6 yellow spots (Fig. 160) . 15. *tayronensis*, n. sp.
 Elytron with 5 yellow spots 39
- 39(38). Length less than 2.0 mm; median lateral spot on elytron regularly oval (Fig. 279); antenna with 11 articles 34. *laterimacula*, n. sp.
 Length more than 2.1 mm; median lateral spot triangular or projecting inward (Fig. 110); antenna with 10 articles. 6. *imitatrix*, n. sp.
- 40(2). Elytron yellow with indistinct, obscure, brownish markings (Fig. 91); antenna with 10 articles . . 4. *helveola*, n. sp.
 Elytron not as described above; antenna with 10 or 11 articles. 41
- 41(40). Elytron with concentric arcs of varying colors 42
 Elytron with distinct spots or maculae 43
- 42(41). Elytral background yellow, punctures pale brown, dark brown curved vitta present medially (Fig. 184) 18. *zonula*, n. sp.
 Elytron with narrow, lateral, yellow band, median, oval reddish yellow area, and broad, irregular sutural vitta (Fig. 352). 50. *circumclusa*, n. sp.
- 43(41). Elytron with 1 black or dark brown spot 44
 Elytron with more than 1 black or dark brown spot . . . 47
- 44(43). Elytron with black spot extended from base at scutellum posteriorly to apical declivity, spot narrowed medially (Fig. 127) 9. *operaria* (Mulsant)
 Elytron with spot not as described above 45
- 45(44). Elytra with butterfly shaped median spot (Fig. 308) 40. *mariposa*, n. sp.
 Elytra with spot not butterfly shaped 46

- 46(45). Elytra with large black spot surrounded by narrow, yellow band (Fig. 227). 26. *uninotata*, n. sp.
 Elytra with spot brown, c-shaped . . . 43. *c-nigrum* Mulsant
- 47(43). Elytron with median, brown, discal spot, spot sometimes united with that on opposite elytron forming single spot, and sometimes with small, obscure, lateral spots; many brown elytral punctures presenting "freckled appearance" (Fig. 189); male pronotum often with 2 large, basomedian yellow spots (Fig. 192). 19. *brethesi*, n. sp.
 Elytron with varying number of spots; never with "freckled appearance; male pronotum without large, basomedian spots 48
- 48(47). Elytron with 3 dark spots, sutural margin with distinct dark border 49
 Elytron with more than 3 dark spots, sutural margin with or without dark border. 51
- 49(48). Elytron with small, discrete, brown spot anterior to middle (Fig. 213); ground color of elytron mostly reddish yellow 23. *campbelli*, n. sp.
 Elytron with large, black, discal spot contiguous with mate on opposite elytron 50
- 50(49). Elytra with cordate, sutural spot in anterior 1/2, spot narrowed posteriorly, 2 large lateral spots present on each elytron (Fig. 83); antenna with 10 articles 3. *matronata* Mulsant
 Elytra with round, sutural spot in middle, 2 small lateral spots present on each elytron (Fig. 232); antenna with 11 articles 27. *onerata* (Mulsant)
- 51(48). Elytron with 4 dark spots, sutural margin narrowly or broadly bordered with black or brown 52
 Elytron with 5 dark spots, sutural margin bordered or not with black or brown. 55
- 52(51). Elytron with elongate, black, humeral spot extended from base past humeral callus, 1 small, elongate spot on

- sutural margin anterior to middle, and 2 small, lateral spots on apical declivity (Fig. 319) 42. *lindae*, n. sp.
 Elytron not as described above 53
- 53(52). Elytron with u-shaped spot in anterior 1/2 curved from base around humeral callus and back to base (Fig. 329) 44. *sagittata* Crotch
 Elytron without u-shaped humeral spot 54
- 54(53). Elytron with 3 spots in row from humerus nearly to suture (Fig. 216) 24. *colombiensis*, n. sp.
 Elytron with 2 spots in anterior 1/2, and 2 spots in posterior 1/2 (Fig. 208) 22. *octonotata*, n. sp.
- 55(51). Pronotum black medially with wide, yellow lateral margins (Fig. 357) 51. *aemulata*, n. sp.
 Pronotum yellow with 4 or 5 brown maculae 56
- 56(55). Pronotum with 4 brown maculae; elytron with brown spots separated by narrow, yellow lines (Fig. 304) 39. *eupaleoides* Crotch
 Pronotum with 5 brown maculae; elytron with 4 brown, discrete, widely separated brown spots (Fig. 361) 52. *dispar*, n. sp.
- 57(1). Elytron pale with dark spots or maculae 58
 Elytron dark with pale spots or maculae 59
- 58(57). Elytra with large, obverse, triangular spot on suture, and one small humeral spot (Fig. 373) . . 55. *herrarai*, n. sp.
 Elytron with suture and 3 spots dark brown to black (Fig. 458) 65. *arida*, n. sp.
- 59(57). Elytron vittate 60
 Elytron not vittate 61
- 60(59). Elytron with median yellow vitta narrow, not enlarged basally (Fig. 464) 66. *elegantissima* Brèthes
 Elytron with median yellow vitta broad, enlarged basally (Fig. 449) 64. *conclusa* Weise

- 61(59). Elytron with single reddish yellow spot on lateral margin (Fig. 422) 61. *funesta* (Germain)
- Elytron without spots, or with 1 or more pale spots, if 1 spot, then elytron with yellow lateral border. 62
- 62(61). Elytron with broad, yellow border, without spots (Fig. 368) 54. *ayacucho*, n. sp.
- Elytron with or without yellow border, always with 1 or more spots present 63
- 63(62). Body extremely elongate, flattened; apical margin of basal sternum sinuate 64
- Body not extremely elongate, flattened; apical margin of basal sternum not sinuate 65
- 64(63). Pronotum with basal margin irregularly yellow; elytron with c-shaped apical spot (Fig. 481) 68. *prolata*, n. sp.
- Pronotum with basal margin black; elytron with apical spot triangular (Fig. 472) 67. *longula* Weise
- 65(63). Species not known from Chile 66
- Species occurring in Chile 69
- 66(65). Elytron with single, elongate, reddish yellow spot (Fig. 419); French Guiana 60. *ingrata* Mulsant
- Elytron with more than 1 spot; French Guiana and elsewhere 67
- 67(66). Pronotum mostly black, lateral margin yellow, and posterior margin with outer 1/3 narrowly yellow (Fig. 386); elytral pattern highly variable (Figs. 386-396); widely distributed, commonly collected species 57. *festiva* Mulsant
- Pronotum variable, but posterior margin not narrowly yellow as described above 68
- 68(67). Elytron with 5 yellow spots, discal and lateral spots usually narrowly connected (Fig. 379) 56. *vredenburghi*, n. sp.
- Elytron with reddish yellow discal and apical spots narrowly connected (Fig. 410) 59. *connectens* (Thunberg)

- 69(65). Elytron with yellow lateral border extended across base to scutellum (Fig. 402) 58. *germainii* Crotch
- Elytron with or without yellow lateral border, if border present, then not extended across base of elytron. 70
- 70(69). Elytron with small, yellow, basal spot between humeral callus and scutellum (Fig. 430) 62. *nana* Mader
- Elytron without basal spot, color pattern variable but usually with discal and lateral spots connected (Figs. 437-440). 63. *sphaeridiodes* Mulsant

Section I

Species with clypeus and frons joined at abrupt angle; protibia slender or slightly flanged.

donzeli group

Hyperaspis species having 10-articled antennae; large body size; clypeus and frons joined at abrupt angle; epipleura obliquely descending externally; protibia apically wide, slightly flanged; and male genitalia similar to *onerata* group.

1. *Hyperaspis latitibia* n. sp.

Type material. Holotype ♂: Bolivia, Santa Cruz, 4-6 k SSE Buena Vista, F&F Hotel, 23-26 Oct 2000, Wappes & Morris (USNM).

Description. ♂, length 3.6 mm, width 2.8 mm; body oval, slightly flattened. Dorsal surface with head alutaceous, weakly shiny; pronotum shiny; elytra shiny. Color black except head yellow with black vertex; pronotum yellow with large, rectangular, basomedian spot, spot widely separated from anterior margin, lateral margin of spot deeply emarginated, elytron with 2 large yellow spots, 1 irregularly rounded, discal spot anterior to middle, 1 transversely oval, subapical spot (Figs. 72, 73); antenna, mouthparts, propleuron yellow; legs yellow except basal 2/3 of femora black; abdomen black with lateral 1/4 reddish yellow. Head punctures fine, separated by

less than a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures much larger than on elytron, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 as large as on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, sparsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral depressions moderate. Antenna with 10 articles. Protibia distinctly flanged (Fig. 74). Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin (Fig. 77). Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum truncate. Genitalia with basal lobe 1/2 as long as paramere, apex narrowly rounded, with large, angulate projection on one margin; paramere wide, tapered from base to rounded apex; (Fig. 75); siphon robust, with apical membranous area, basal capsule with inner arm short, wide, outer arm wide, longer than inner arm, apically knobbed, basal border slightly emarginate (Fig. 76).

♀ Not known.

Etymology. The species name is from the Latin *latus*, meaning broad, and *tibia*, referring to the flanged protibia.

Remarks. This species has the same elytral color pattern as several species of *Hyperaspis*, but *H. latitibia* is larger and the protibia is flanged.

2. *Hyperaspis donzeli* (Mulsant, 1850)

Cleothera donzeli Mulsant, 1850: 638.

Hyperaspis donzeli: CROTCH 1874: 222; KORSCHESKY 1931: 187; BLACKWELDER 1945: 447; GORDON 1987: 28.

Type locality. Brazil. MNHP (lectotype here designated).

Description. ♂, length 3.0 mm, width 2.6 mm; body

form round, slightly flattened. Dorsal surface with head feebly shiny, alutaceous; pronotum and elytron shiny. Color black except pronotum yellow with large, black, irregularly rectangular basomedian spot, anterior margin of spot widely separated from anterior pronotal margin; elytron with 3 yellow spots, 1 round spot medially on disc, 1 triangular spot on lateral margin laterad of discal spot, 1 transversely oval, subapical spot (Fig. 79); antenna, mouthparts, propleuron, legs yellow; abdomen black except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, separated by a diameter medially, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, very fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, strongly descending externally, femoral excavations deep. Antenna with 10 articles. Protibia distinctly flanged. Prosternum with intercoxal carinae tapered toward base, basally stemmed, reaching basal margin. Protibia distinctly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum slightly rounded. Genitalia with basal lobe 3/4 length of paramere, strongly, obliquely truncate apically, abruptly sinuate on one side; paramere wide, nearly parallel sided, apex rounded (Fig. 80); siphon robust, curved upward, with membranous area, basal capsule with inner arm short, wide, outer arm long, apically knobbed, base sinuate (Figs. 81, 82).

♀ Not known.

Geographical distribution: Brazil, Paraguay.

Specimens examined: 1. Paraguay: Itapua, Sa. Trinidad (USNM).

Remarks. *Hyperaspis donzeli* has the same elytral color pattern as *H. pseudodonzeli* known from Trinidad and northern South America. However, *Hyperaspis donzeli* differs by the 10-articled

antenna, subapical elytral spots evenly, transversely oval, and the flanged protibia.

A lectotype is here designated to stabilize future usage of this name.

3. *Hyperaspis matronata* (Mulsant, 1853)

Cleothera matronata Mulsant, 1853: 71.

Hyperaspis matronata: CROTCH 1874: 226; KORSCHESKY 1931: 192; BLACKWELDER 1945: 447; GORDON 1987: 28.

Cleothera cordifera Weise, 1895: 128. (n. syn.)

Hyperaspis cordifera: KORSCHESKY 1931: 186; BLACKWELDER 1945: 446.

Type locality: of *matronata*, Brazil, UMZC (lectotype designated by GORDON 1987); of *cordifera*, Paraguay, ZMHB (lectotype here designated).

Description. ♂, length 2.6 mm, width 2.1 mm; body form oval, flattened. Dorsal surface with head feebly shiny, alutaceous: pronotum feebly shiny, alutaceous: elytron shiny. Color yellow except pronotum with large, black, basomedian spot, anterior margin of spot widely separated from anterior pronotal margin, lateral margin with earlike projections; elytron with 3 black spots, 1 obliquely oval spot connected to black sutural border on disc, spot together with matching spot on opposite elytron forming a cordate median macula, 1 large, black, triangular spot laterally posterior to humerus, 1 large, more or less triangular spot medially on apical declivity (Fig. 83); pro-, meso-, metasterna black; abdomen black except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice diameter. Metasternal punctures larger than on elytron, very sparse medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, feebly grooved internally, weakly descending externally, femoral excavations deep. Antenna with 10 articles. Protibia

distinctly flanged. Antenna with 11 articles (Fig. 84). Prosternum with intercoxal carinae narrowly separated at apex, tapered toward base, basally stemmed, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum truncate. Genitalia with basal lobe 3/4 length of paramere, strongly, obliquely truncate apically, abruptly sinuate on one side (asymmetry reversed); paramere wide, tapered to rounded apex in apical 3/4 (Fig. 85); siphon slender, apically sinuate, with membranous area, basal capsule with inner arm wide, outer arm slightly longer than inner, apically knobbed, base sinuate (Figs. 86, 87).

♀ Similar to ♂ except head with vertex and triangular area on frons black; pronotum entirely black except lateral 1/6 yellow. Genitalia with beak of basal unit large, hastate; connecting duct short (Figs. 88-90).

Variation. Length 2.4 to 3.0 mm, width 1.9 to 2.5 mm. Frons of ♀ varies in color from frontal area black to light brown. Size of elytral spots varies slightly.

Geographical distribution: Southeastern South America

Specimens examined: 28. Argentina: Chaco, Charata; Corrientes, Santo Tomé; Department Resistencia, Chaco; Cordoba; Misiones; Salta, Guemes. Bolivia: Tiguipa; "Ost Bolivien." Brazil: Guanabara, Rio de Janeiro; Nova Teutonia. Paraguay: San Bernardino; Amanbay; San Pedro; Cororo-Rio Yapané; Sapucay (CDA) (MBR) (USNM) (ZMHB).

Remarks. *Hyperaspis matronata* has a distinct color pattern by which it can be recognized. ♂ genitalia differ from those of other species because of reversed symmetry in the basal lobe.

Cleothera cordifera in no way differs from *H. matronata*; therefore it is a junior synonym. The lectotype of *C. cordifera* is here designated to stabilize future usage of this name. It is labeled "Paraguay Drake (green paper)/*Hyperaspis matronalis* Muls *cordifera* Ws (Weise's writing in purple ink)/Syntypus, *Cleothera cordifera* Weise, 1895, labelled by MNHB 2004 (red paper)." Two additional specimens in the series labeled "Amer Drake (green paper)," and "Amer.m (green paper)" are considered type material and are designated as paralectotypes.

4. *Hyperaspis helveola* n. sp.

Type material. Holotype ♂: Brazil, S. Paulo (São Paulo), Cantareira, 4.XII.1958, J. Halik, 11308, Brasil, Halik Collection 1966 (USNM). Allotype. Brazil, Minas Gerais, V. Monte Verde, 14.XII.1961, J. Halik, 17761, Brasil, Halik Collection, 1966 (USNM). Paratypes. 4. 1, Brazil, São Paulo, Cantareira, 15.VIII.1963, J. Halik, 22689, Brasil, Halik Collection, 1966 (USNM); 1, Brazil S. Paulo, horto flor. (T G), 30.I.1959, Brasil, Halik Collectin, 1966 (USNM); 1, Brazil, S. Paulo, Est. S. Paulo, 24.12, Saude 1722, J. Melzer Brasilien, det. by F. W. Nunenmacher, *H. dilatata* Cr., Korschefsky Collection 1952 (USNM); 1, Brazil, Cipo Sao Paulo, 29 Nov 1965, V. N. Alin (BM).

Description. ♂, length 2.8 mm, width 2.5 mm; body form round, convex. Dorsal surface with head dull, strongly alutaceous, pronotum less dull than head, shiny, elytra shiny. Color yellow except pronotum with 4 median brown spots, anterior 2 spots triangular, basal 2 spots slightly triangular, narrowly separated anterior to scutellum; elytron with 2 vaguely defined brown macula, 1 short macula near suture anterior to middle, 1 long, comma-shaped macula laterally from humeral angle to apical 1/4 (Fig. 91); antenna, mouthparts, legs, and most of abdomen reddish yellow; pro-, meso-, metasterna and median area of basal abdominal sternum dark brown. Head punctures very fine, hidden in dense alutaceous sculpture. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures larger than on elytron, sparse medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc feebly shiny, alutaceous, coarsely, sparsely punctured. Clypeal apex weakly emarginate, clypeus and clypeus and frons abruptly joined. Epipleuron oblique, internally grooved, strongly descending externally, femoral excavations deep. Antenna with 10 articles (Fig. 92). Prosternum with intercoxal carinae convergent toward base, basally stemmed, reaching basal margin. Protibia slightly flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, curved along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum dis-

tinctly emarginate. Genitalia with basal lobe $3/4$ length of paramere, wide, with abruptly angulate projection on one side; paramere short, very wide, narrowed to rounded apex in apical $1/4$ (Fig. 94); siphon robust, apex sinuate, with membranous area, basal capsule with inner arm long, slender, outer arm short, wide (Figs. 95, 96).

♀ Similar to male except vertex and upper $1/2$ of frons dark brown. Genitalia with beak of basal unit short, robust, very wide (Figs. 97-99).

Variation. Length 2.7 to 3.2 mm, width 1.4 to 2.7 mm Elytron with vague brown areas varying from entirely absent to expanded, occupying most of elytron.

Etymology. The specific name is from the Latin *helvus*, meaning yellow, *helveolus* (pale yellow), and refers to the dorsal coloration.

Remarks. This is a large, pale species with elusively vague elytral maculation. No other species of South American *Hyperaspis* has the same combination of dorsal color and body shape.

chapini group

Hyperaspis species having 10-articled antenna; small body size; clypeus and frons abruptly joined or joined at slight angle (*H. scutifera*); epipleura flat, not descending externally; protibia narrow, not flanged; and male genitalia of varying types.

Two species in this group, *H. imitatrix* and *H. chapini*, are closely related, sharing the same type of male genitalia having an extremely long siphon.

5. *Hyperaspis scutifera* (Mulsant, 1850)

Cleothera scutifera Mulsant, 1850: 565.

Hyperaspis scutifera: CROTCH 1874: 216; KORSCHESKY 1931: 195; BLACKWELDER 1945: 448.

Hyperaspis incompleta Crotch, 1874: 225; KORSCHESKY 1931: 225; BLACKWELDER 1945: 445; GORDON 1987: 28. (n. syn.)

Type locality: of *scutifera*, Venezuela, Valencia, DEZ (lectotype here designated); of *incompleta*, Colombia, UMZC (holotype).

Description. ♂, length 2.4 mm, width 1.7 mm; body oval, convex. Dorsal surface with head weakly shiny alutaceous; pronotum and elytra shiny, slightly alutaceous. Color yellow, pronotum black with lateral 1/5 yellow, inner margin of yellow area straight; elytron with irregular, black, sutural spot, spot abruptly widened posterior to scutellum and again posterior to middle, a small poorly defined spot on humeral callus (Figs. 100, 101); antenna, mouthparts, propleuron, epipleuron and legs yellow; abdomen with lateral 1/8 and sterna 5-6 yellowish red. Head punctures distinct, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated a diameter or less; elytral punctures as large as on pronotum, separated by less than a diameter. Metasternal punctures larger than on elytron, sparse medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at slight angle. Epipleuron flat, slightly grooved medially, not descending externally, femoral excavations moderate, not deep. Antenna with 10 articles (Fig. 103). Prosternum with intercoxal carinae convergent from apex toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe as long as paramere, with small projection on one margin; paramere slender, tapered from basal 1/4 to rounded apex (Fig. 105); siphon slender, inner arm long, outer arm shorter than inner arm, basal border widely, shallowly emarginate (Figs. 106-107).

♀ Similar to male except head black; anterolateral pronotal angle narrowly yellow. Genitalia with beak of basal unit large, elongate, connecting duct short (Fig. 108).

Variation. Length 2.4 to 2.6 mm, width 1.6 to 1.7 mm. Dorsal color may be black except head yellow; elytron bordered with yellow except sutural margin, yellow border extended from laterad of scutellum around elytron nearly to suture at apex, inner margin of border sinuate, basal portion of lateral yellow border may be re-

duced or absent (Fig. 102), and there is a tendency for the yellow border to separate from an apical yellow spot. The lectotype female has the yellow elytral border uniform, not sinuate, except for a distinct posterior extension on each side of scutellum.

Geographical distribution: Colombia, Venezuela, Curaçao.

Specimens examined: 15. Colombia: Meta, Puerto Gaitàn, Calimagua; Valle Palmeira. Curaçao: Schottgatwee; Zapateer. Venezuela: Aragua, Cagua; Chacas, nr. Caracas; Damacar; Tocayo; Valencia (BM) (DEI) (USNM).

Remarks. The color pattern(s) of this species is not uncommon in South American *Hyperaspis* species, but unique among those with 10-articled antennae. The dorsal color pattern is highly variable (Figs. 100-102), but genital characters are mostly stable. Specimens from Curaçao might not belong to this species. However, the genitalic differences are not definitively distinct, and we consider them, at least provisionally, to be *H. scutifera*.

The ♀ genitalia of type specimens of *H. scutifera* and *H. incompleta* were examined and appear identical. Therefore, we consider them synonyms. A ♀ syntype of *H. scutifera* is here designated to stabilize future usage of this name. It is in the DEI collection, labeled "Venezuela Schaum (handwritten)/Coll. Haag/Syntypus (pink paper)/*scutifera* mls. typ."

6. *Hyperaspis imitatrix* n. sp.

Type material. Holotype ♂: Brazil, Chapada, Acc. No. 2966, Dec. (CMNH).

Paratype: Bolivia, Warscewski (sic !) (ZMHB).

Description. ♂, length 2.3 mm, width 1.7 mm; body oval, convex. Dorsal surface with head weakly shiny, alutaceous: pronotum and elytra shiny, slightly alutaceous. Color black except head yellow; pronotum with large, basomedian black spot, anterior border of spot arcuate; elytron with 5 yellow spots, scutellar spot at base slightly rectangular, small oval spot at middle anterior to apical declivity, elongate humeral spot on lateral margin from base nearly to midpoint of elytron, triangular spot on lateral margin posterior to midpoint, and transversely oval subapical spot (Figs.

109, 110); antenna, mouthparts, propleuron, epipleuron and legs yellow; abdomen brown with lateral 1/8 and sterna 5-6 yellow. Head punctures distinct, separated by a diameter or less. Pronotal punctures slightly larger than on head, separated a diameter or less; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, sparse medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, sparse medially, becoming dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex deeply emarginate; clypeus and frons joined at abrupt angle. Epipleuron flat, slightly grooved medially, not descending externally, femoral excavations deep. Antenna with 10 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, not reaching basal margin, not basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum distinctly emarginate. Genitalia with basal lobe as long as paramere, with large, rounded projection on one margin; paramere slender, tapered from basal 1/4 to rounded apex; trabes apically curled (Fig. 111); siphon slender, extremely long, about 5 times length of phallobase, apex unmodified, basal capsule with inner arm long, outer arm nearly absent (Fig. 112).

♀ Not known.

Variation. Paratype with pronotum entirely yellow except for narrow, black, basomedian border, border widened at each end; elytron with subapical spot narrowly connected to median spot, elytral maculation larger than in holotype.

Etymology. The specific name refers to the similarity in size, shape, and color pattern to some variations of *H. incompleta*.

Remarks. This species and *H. scutifera* are similar in external appearance, but *H. imitatrix* has male genitalia with an extremely long siphon, the longest yet observed in *Hyperaspis*. In addition, the apically curled trabes is shared only with *H. chapini*, which has a single discal spot on each elytron.

7. *Hyperaspis chapini* n. sp.

Type material. Holotype ♂: Trinidad, B.W.I. (British West Indies), 1903, G. E Bryant, G. Bryant Coll. 1919-147 (BM). Allotype ♀: same data as holotype (BM). Paratypes, 2: same data as holotype (BM).

Description. ♂, length 2.1 mm, width 1.7 mm; body oval, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum slightly alutaceous, shiny; elytra shiny. Color black except head yellow; pronotum yellow with large, basomedian black spot extended $3/4$ distance to anterior border, lateral margin of spot emarginated; elytron dark brown with 1 reddish yellow, elongate spot on disc slightly posterior to middle (Fig. 113); antenna, mouthparts, propleuron, legs yellow; epipleuron reddish brown; abdomen brown with lateral $1/8$ to $1/4$ yellow. Head punctures distinct, separated by less than a diameter. Pronotal punctures slightly larger than on head, separated by a diameter or less; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 as large as on elytra, dense medially, becoming fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, slightly grooved internally, descending externally, femoral excavations deep. Antenna with 10 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved $1/2$ distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum distinctly emarginate. Genitalia with basal lobe $3/4$ as long as paramere, deeply notched on one margin just before base; paramere slender, tapered from basal $1/4$ to rounded apex; trabes apically curled (Fig. 114); siphon slender, extremely long, about 5 times length of phallobase, apex unmodified, basal capsule with inner arm long, outer arm nearly absent (Figs. 115, 116).

♀ Similar to male except head black; pronotum black with anterolateral angle and lateral border narrowly reddish yellow. Genita-

lia with beak of basal unit large, oval; connecting duct short (Figs. 117-118).

Variation. Length 2.1 to 2.4 mm, width 1.7 to 1.8 mm. Female pronotal color varies from that described above to having lateral 1/5 bright yellow.

Etymology. This species is named for Edward A. Chapin, whose systematic research on Coccinellidae has survived the test of time extraordinarily well.

Remarks. This species has a dorsal color pattern unique among species having 10-articled antenna. Male genitalia share with *H. imitatrix* an extremely long siphon and apically twisted trapeses, characters unknown among other *Hyperaspis* species.

onerata group

Hyperaspis species having 11-articled antenna; body slightly dorsoventrally flattened or convex; clypeus and frons joined at abrupt angle; protibia usually narrow, sometimes slightly widened apically; male genitalia with basal lobe usually short, bent medially, obliquely rounded or obliquely truncate apically, with a distinct lateral projection of varying size and shape, wide or oval (Figs. 123, 129, 140, etc.). This group contains both convex and dorsoventrally flattened species. The former are placed first on the assumption that a convex body is a more primitive character state than a flattened body.

8. *Hyperaspis cracentis* n. sp.

Type material. Holotype ♂: Brazil, Rio de Jan. (Rio de Janeiro), Acc No. 2966 (CMP). Allotype ♀: same data as holotype (CMP). Paratypes, 3: same data as holotype except 2 paratypes with additional label "Oct." (CMP) (USNM).

Description. ♂, length 2.5 mm, width 1.8 mm; body oval, somewhat elongate, convex. Dorsal surface with head alutaceous, dull; pronotum slightly alutaceous, feebly shiny; elytra shiny. Color black except head yellow; pronotum with lateral 1/5 and apical 1/4 yellow, elytron with 3 small, yellow spots, 1 spot medially on disc irregularly round, 1 spot on medial lateral margin

medially oval, 1 transversely oval subapical spot (Figs. 119, 120); antenna, mouthparts, propleuron, epipleuron and legs yellow except basal 1/4 of pro- and mesofemora dark brown, basal 1/2 of metafemur dark brown; abdomen dark brown with lateral 1/8 and sterna 5-6 brownish yellow. Head punctures fine, nearly invisible in alutaceous sculpture, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures much larger than on elytron, coarse, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, dense medially, becoming fine, dense laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron slightly oblique, internally grooved, weakly descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged (Fig. 121). Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin (Fig. 122). Fifth sternum with apex broadly, weakly emarginate; 6th sternum distinctly emarginate. Genitalia with basal lobe 1/2 as long as paramere, wide, apex slightly rounded, with angulate projection on one margin; paramere wide, tapered from apical 1/4 to rounded apex; (Fig. 123); siphon robust, short, apex sinuate with membranous area, basal capsule with inner arm robust, outer arm shorter than inner, apically truncate (Figs. 124, 125).

♀ Similar to ♂ except head black; pronotum black except lateral 1/5 yellow. Genitalia with beak of basal unit short, curved; connecting duct short (Fig. 126).

Variation. Length 2.4 to 2.7 mm, width 1.8 to 2.0 mm.

Etymology. The specific name is from the Latin *cracens*, meaning neat, graceful, referring to the elegant and graceful dorsal appearance.

Remarks. The dorsal color pattern and very coarse ventral punctation distinguish this species.

9. *Hyperaspis operaria* (Mulsant, 1853)

Cleothera operaria Mulsant, 1853: 70.

Hyperaspis operaria: CROTCH 1874: 224; KORSCHESKY 1931: 193; BLACKWELDER 1945: 447; GORDON 1987: 28.

Hyperaspis insignis Crotch, 1874: 226; KORSCHESKY 1931: 190; BLACKWELDER 1945: 447. (n. syn.)

Hyperaspis communalis Brèthes, 1925b: 4; KORSCHESKY 1931: 186; BLACKWELDER 1945: 446. (n. syn.)

Type locality: of *operaria* (UMZC, lectotype designated by GORDON 1987) and *insignis* (UMZC, holotype), Brazil; of *communalis* (BM, holotype), Río de Janeiro (Brazil).

Description. ♂, length 2.8 mm, width 2.2 mm; body form oval, convex. Dorsal surface with head dull, alutaceous: pronotum alutaceous, slightly shiny: elytron slightly alutaceous, shiny. Color yellow except pronotum with large, black, basomedian spot, anterior margin of spot broadly triangular, base of spot wide, contiguous with black elytral spot; elytron with basal, lateral, and apical borders very narrowly black, with 1 large black spot extended from base on each side of scutellum posteriorly to apical declivity, spot "pinched" medially, apically rounded (Fig. 127); pro-, meso-, metasterna black; outer margin of propleuron yellow; outer margin of epipleuron reddish yellow; abdomen black except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, distinct, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, sparsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, descending externally, femoral excavations deep. Prosternum with intercoxal carinae narrowly separated at apex, tapered nearly to base, basal stem short, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum feebly emarginate.

Genitalia with basal lobe $3/4$ length of paramere, sinuate, strongly, obliquely truncate apically, sinuate, with angulate projection on one side; paramere wide, tapered to rounded apex in apical $3/4$ (Fig.129); siphon short, robust, apically sinuate, with membranous area, basal capsule with inner arm wide, short, outer arm wide, longer than inner arm, apically knobbed, base sinuate (Figs.130, 131).

♀ Similar to male except length 3.3 mm, width 2.7 mm; black spot on pronotum and black spot on sutural margin of elytron slightly smaller; elytron with small, faint, brown spot. Genitalia with basal unit expanded, tapered on each end, beak large; connecting duct short (Fig. 132, 133).

Variation. Length 2.8 to 3.3 mm, width 2.2 to 3.3 mm. Size of black elytral spot varies from the typical to wide basally, and long, tapered apically (Fig. 128, *H. insignis*), to narrow basally and short, tapered apically; black outer elytral border absent in *H. insignis*.

Geographical distribution: Brazil

Specimens examined: 3 (the type specimens): 2 Brazil, 1 Brazil, Rio de Janeiro.

Remarks. *Hyperaspis operaria* has a dorsal color pattern that is unique within the South American fauna. The type specimens of *H. operaria* and *H. communalis* have virtually identical color patterns, but the color pattern of *H. insignis* varies somewhat from the typical. After comparing these three type specimens, we conclude that they represent the same species; hence the synonymy listed above. However, examination of male specimens of *H. insignis* may validate that name as a distinct species.

10. *Hyperaspis limbigera* (Mulsant, 1853)

Cleothera limbigera Mulsant, 1853: 77.

Hyperaspis limbigera: CROTCH 1874: 225; KORSCHESKY 1931: 191; GORDON 1987: 28.

Hyperaspis limbifera: BLACKWELDER 1945: 447.

Type locality. Brazil, UMZC (lectotype designated by GORDON 1987).

Description. ♂, length 2.8 mm, width 2.4 mm; body form rounded, convex. Dorsal surface with head dull, alutaceous: pronotum shiny: elytron shiny. Color yellow except pronotum with

2 large, dark brown, narrowly separated triangular spots at base, spots widely separated from apical margin, and small, light brown, oblong spot near lateral margin; elytron with irregular brown border on sutural margin, border slightly expanded in anterior 1/3, and connected to large, irregular brown band on apical declivity, brown band curved laterally and anteriorly, reaching base anterior to humeral callus, brown sutural border feebly connected to lateral band in basal 1/3 (Figs. 134, 135); pro-, meso-, metasterna blackish brown; abdomen yellowish brown except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures smaller than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures coarse, much larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, moderately dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Antenna with 11 articles (Fig. 136, basal article missing). Epipleuron oblique, grooved internally, descending externally, femoral excavations deep. Prosternum with intercoxal carinae widely separated at apex, convergent nearly to base, basal stem short, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, slightly flattened along margin, apex recurved 3/8 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 5/8 length of paramere, sinuate, strongly, obliquely truncate apically, sinuate, with strong, angulate projection on one side; paramere wide, tapered to rounded apex in apical 3/4; siphon long, robust, apically sinuate, with membranous area, basal capsule with inner arm long, slender, apically knobbed, outer arm short, wide, apically knobbed, base sinuate.

♀ Similar to male except triangular pronotal spots widely separated from anterior margin; apex of apical tergum with row of large spines. Genitalia with basal unit elongate; connecting duct short (Fig. 137).

Variation. Length 2.7 to 3.0 mm, width 2.4 to 2.5 mm. Elytron with connection of brown sutural border to lateral brown band feeble, strong, or entirely absent.

Geographical distribution: Brazil

Specimens examined: 4. Brazil: "Brazil" (lectotype); Rio de Janeiro; São Paulo (BM) (UMZC) (USNM).

R e m a r k s . *Hyperaspis limbigera* is distinguished by a combination of dorsal color pattern, elytral punctures distinctly smaller than pronotal punctures, and row of strong spines at apex of the female apical tergum.

11. *Hyperaspis bisignata* n. sp.

Type material. Holotype ♂: (Argentina), Est. Exp. Loreto, Dr. A. Ogloblin, Willard H. Nutting, Jr., collection donated to the Calif. Academy of Sciences May 1990 (CAS). Allotype ♀: Brazil, St Catarina (Santa Catarina), Plaumann, Willard H. Nutting, Jr., collection donated to the Calif. Academy of Sciences May 1990 (CAS). Paratypes, 10. 1, same data as holotype (CAS); 1, same data as allotype (CAS); 1, (Argentina), Est. Exp. Loreto, 193..., Dr. A. Ogloblin, Korschefsky Collection 1952, Willard H. Nutting, Jr., collection donated to the Calif. Academy of Sciences May 1990 (CAS); (Argentina), Est. Exp. Loreto, 193..., Dr. A. Ogloblin (CAS); 1, Brazil, Rio (Grande) do Sul, Lagos. S. Catar (Santa Catarina), 14.I.953, W. Wittmer (CAS); 2, Brazil, Est. S. Paulo (São Paulo), Capitâl; Coll. A. Sacca, 573, Korschefsky Collection 1952 (USNM); 1, (Brazil), São Paulo, Det. by F. W. Nunenmacher, Korschefsky Collection 1952 (USNM); 1, (Brazil), São Paulo, Capital, Col. J.P.F., 21-X-31, R. Korschefsky cum. type comp., *Hyperaspis Deyrollei* Cr., Korschefsky Collection 1952 (USNM); 1, Bolivia, Dept S. Cruz (Santa Cruz), 450 m, umg. Buenavista, Steinback coll., det. by F. W. Nunenmacher, *H. petropolitana* Cr., Korschefsky Collection 1952 (USNM).

D e s c r i p t i o n . ♂, length 3.0 mm, width 2.4 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull: pronotum alutaceous, feebly shiny; elytra shiny. Color black except head yellow; pronotum with lateral 1/4 and apical 1/4 yellow, elytron with 2 yellow spots, median spot slightly anterior to middle, irregularly rounded, subapical spot transversely oval (Figs. 138, 139); antenna, labial palpi, propleuron yellow; legs reddish yellow except basal 3/8 of femora black; abdomen black with lateral 1/8 reddish yellow. Head punctures fine, nearly invisible in alutaceous sculpture,

separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to a diameter. Metasternal punctures much larger than on elytron, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Epipleuron oblique, not internally grooved, weakly descending externally. Clypeal apex deeply emarginate. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward base, basally stemmed. Protibia not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum nearly truncate. Genitalia with basal lobe 2/3 as long as paramere, wide, apex slightly rounded, with angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 140); siphon robust, short, apex curved upward with membranous area, basal capsule with inner arm slender, long, outer arm slender, longer than inner, apically truncate (Fig. 141, 142).

♀ Similar to ♂ except head yellow with vertex and narrow lateral border inside eye black; pronotum black except lateral 1/4 yellow. Genitalia with beak of basal unit short, curved; connecting duct short (Fig. 143).

Variation. Length 2.6 to 3.3 mm, width 2.0 to 2.6 mm.

Etymology. The specific name is from the Latin *bis*, meaning two, and *signata*, meaning mark, referring to the presence of 2 spots on each elytron.

Remarks. This species is very similar to *H. camargoi* but is distinguished from that species by the following: larger in average size; ♀ head mostly yellow; small elytral spots, median elytral spot anterior to middle, widely separated from postapical spot; basal lobe of ♂ genitalia slightly longer and proportionately not as wide; siphon shorter, siphonal basal capsule not sinuate, inner and outer arms not apically knobbed.

12. *Hyperaspis camargoi* n. sp.

Type material. Holotype ♂: Brazil, Campinas, F. C. Camargo, *Hyperaspis silvestris* Ws. ab. det. R. Korschefsky 27, Korschefsky Collection 1952 (USNM). Allotype ♀: Brasil, Campinas, F. C. Camargo, Korschefsky Collection 1952 (USNM). Paratype: Brasil, same data as allotype (USNM).

Description. ♂, length 2.4 mm, width 1.8 mm; body oval, convex. Dorsal surface with head weakly alutaceous, dull: pronotum and elytron shiny. Color black except head yellow; pronotum with lateral 1/4 and apical 1/6 yellow, elytron with 2 large yellow spots, postmedian spot irregularly round, subapical spot transversely oval, narrowly separated from postmedian spot (Figs. 144, 145); antenna, labial palpi, propleuron, tibiae yellow; pro-, meso-, and metasterna brown; abdomen with median area of sterna 1-5 brown, lateral 1/8 and 6th sternum yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by 1 to 2 times a diameter; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures much larger than on elytron, nearly absent medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 146). Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum nearly truncate. Genitalia with basal lobe 1/2 as long as paramere, wide, apex obliquely truncate, with angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 147); siphon slender, long, apex slightly curved upward, basal capsule sinuate, with inner and outer arms slender, long, outer arm longer than inner, both arms apically knobbed (Figs. 148, 149).

♀ Similar to male except head black. Genitalia with beak of basal unit short, curved; connecting duct short (Figs. 150, 152).

Variation. Length 2.3 to 2.5 mm, width 1.7 to 1.8 mm. Size of elytral spots slightly variable.

Etymology. This species is named for F. C. Camargo, collector of the type series.

R e m a r k s . See remarks under *H. bisignata*.

13. *Hyperaspis biguttata* (Sicard, 1912)

Cleothera biguttata Sicard, 1912: 136.

Hyperaspis biguttata: KORSCHESKY 1931: 185; BLACKWELDER 1945: 446.

Type locality. Brazil, Santos, DEI (lectotype here designated).

D e s c r i p t i o n . ♂, length 2.4 mm, width 2.0 mm; body form rounded, convex. Dorsal surface with head alutaceous, feebly shiny; pronotum feebly alutaceous, shiny; elytron slightly alutaceous, shiny. Color black except head yellow; pronotum yellow with large, median black area, black area not extended to anterior pronotal margin and strongly indented laterally with yellow; elytron with 2 yellow spots, 1 oval spot on disc, 1 transverse, apical spot at posterolateral angle (Fig. 153); mouthparts, propleuron, legs reddish yellow; pro-, meso-, metasterna black; abdomen dark brown except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than elytral punctures, sparse medially, contiguous laterally. Punctures on basal abdominal sternum coarse, sparse, punctures on sterna 2-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, nearly impunctate. Clypeal apex weakly emarginate, clypeus and frons joined at right angle. Epipleuron flat, grooved internally, weakly descending externally, femoral depression deep. Prosternum with intercoxal carinae widely separated at apex, tapered toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin,

apex recurved $1/2$ distance to basal sternal margin. Fifth sternum with apex broadly, deeply emarginate; 6th sternum distinctly emarginate. Genitalia with basal lobe $3/4$ length of paramere, obliquely truncate apically, with large, obtuse projection on one side; paramere wide, tapered to rounded apex in apical $1/2$ (Fig. 154); siphon robust, apically sinuate, with membranous area, basal capsule with inner arm long, slender, outer arm shorter than inner arm, basal border emarginate (Fig. 155).

♀ Not known.

Variation. None observed.

Geographical distribution: Brazil.

Specimens examined: 1. Brazil (lectotype) (DEI).

Remarks. This species is similar to *H. bisignata* in dorsal color pattern, but the apical spot is distinctly transverse in *H. biguttata*, rounded in *H. bisignata*, and *H. biguttata* has the median, black pronotal area very strongly indented with yellow laterally. In addition, the siphonal capsule differs between these species.

A ♂ type specimen in the DEI is designated as lectotype to stabilize future usage of this name. Lectotype labels are "Santos, J. Metz/Coll. Kraatz Sicard det./Syntypus (pink paper) /*Hyperaspis biguttata* Sic n. sp. type".

14. *Hyperaspis cleida* Mulsant, 1850

Hyperaspis cleida Mulsant, 1850: 670; CROTCH 1874: 229; KORSCHESKY 1931: 186; BLACKWELDER 1945: 446.

Description. ♂, length 2.6 mm, width 1.8 mm; body form elongate, slightly flattened. Dorsal surface with head alutaceous, feebly shiny; pronotum alutaceous, feebly shiny; elytron slightly alutaceous, shiny. Color black except head yellow; pronotum black except narrow anterior margin and lateral $1/4$ yellow; elytron with 4 yellow spots, 1 obliquely oval spot laterad of scutellum, 1 round spot just anterior to apical declivity near suture, 1 small, triangular spot on lateral margin at apical declivity, 1 transversely oval spot at apex near suture (Figs. 156, 157); mouthparts, propleuron, pro- and mesolegs reddish yellow, metafemur brown; pro-, meso-, metasterna black; abdomen dark brown except outer

1/6 of sterna 1-4 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter; pronotal punctures very coarse, separated by a diameter or less; elytral punctures slightly larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than elytral punctures, sparse medially, separated by less than a diameter laterally. Punctures on basal abdominal sternum coarse, sparse, punctures on sterna 2-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, sparsely, coarsely punctured. Clypeal apex strongly emarginate, clypeus and frons joined at right angle. Epipleuron flat, grooved internally, weakly descending externally, femoral depression deep. Prosternum with intercoxal carinae widely separated at apex, tapered toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe 1/2 length of paramere, obliquely rounded apically, with large, angulate projection on one side; paramere wide, tapered to rounded apex in apical 1/3 (Fig. 158); siphon robust, apically sinuate, with membranous area, basal capsule with inner arm long, robust, outer arm shorter than inner arm, basal border emarginate (Figs. 159).

♀. Not known.

Variation. None observed.

Type locality: Brazil.

Geographical distribution: Brazil.

Specimens examined: 1. Brazil.

Remarks. The species described above is recognized by the presence of 4 yellow, elytral spots, and extremely coarse dorsal and ventral punctation.

Hyperaspis cleida was described by Mulsant from specimen(s) in the Chevrolat collection, which was subsequently obtained by Crotch. A single specimen in that collection is labeled "♂ (green paper)/187 (yellow paper) *cleida* m." There is no indication that this is a type; however, it matches Mulsant's original description extremely well; therefore, we assume it to be an example of *H. cleida*, but do not designate it as a lectotype.

15. *Hyperaspis tayronensis* n. sp.

Type material. Holotype ♂: Colombia, Magd. (Magdalena), Parque Tayrona, 21 mi. E. Sta. Marta, V-17-1973, Howden & Campbell (CNC). Paratypes, 2. 1, Colombia, Magd., 12 mi. W. Sta. Marta, V-18-1973, Campbell & Howden; 1, Colombia, Magd., 25 km. E. Barranquilla, V-16-1973, Campbell & Howden (CNC) (USNM).

Description. ♂, length 2.3 mm, width 1.7 mm; body oval, convex. Dorsal surface with head alutaceous, dull; pronotum and elytra slightly alutaceous, shiny. Color dark brown except head yellow; pronotum yellow with small, round, median brown spot on lateral 1/3, large, basomedian, anchor-shaped brown spot not extended to apical margin; elytron with 7 small, yellow spots, 1 round scutellar spot, 1 very small, oval spot between scutellar spot and humerus, 1 oval spot on humeral angle, 1 irregularly triangular discal spot, 1 elongate spot on lateral margin laterad of discal spot, spot on apical declivity narrowly connected to posterior spot on lateral angle (Figs. 160, 162); pro-, meso-, metasterna dark brown; abdomen brownish yellow with lateral 1/8 and sterna 5-6 yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, absent medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, sparse medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, feebly grooved internally, descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved 3/8 distance to basal sternal margin. Fifth sternum with apex barely perceptibly emarginate; 6th sternum nearly truncate. Genitalia with basal lobe 2/3 as long as paramere, apex obliquely rounded, with strong angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 163); siphon ro-

bust, apex sinuate, with membranous area, basal capsule with inner arm wide, longer than outer arm, outer arm wide, short, apically truncate (Figs. 164, 165).

♀ Not known.

Variation. Length 2.3 to 2.5 mm, width 1.7 to 2.0 mm. Median pronotal spot may be divided medially into narrow, transverse brown vitta with each end bent anteriorly, and irregularly triangular apical spot extended laterally nearly to round lateral spot; yellow elytral spots may be large with scutellar, discal, medial lateral, and spot on apical declivity narrowly connected (Fig. 161).

Etymology. The species is named for Parque Tayrona where the holotype was collected.

Remarks. Seven spots on each elytron and the unusually marked pronotum are characters shared only with *H. histrionica*.

Very few Colombian species were available to early systematists such as Mulsant and Crotch; therefore, a high percentage of species from this region remain undescribed. These Colombian species tend to have very distinctive dorsal color patterns as evidenced by *H. tayronensis*.

16. *Hyperaspis pseudonzei* n. sp.

Type material. Holotype ♂: Venezuela, Aragua, Palo Negro, 455 m, 31-VII-1959, sobre escamas en suda (sic!), E. No. 16, col. A. Notz (USNM). Allotype ♀: Trinidad, St. Augustine, BWI, Feb. 52, Collector F.D. Bennett, *Orthezia insignis* on croton (USNM). Paratypes, 38. 8, same data as allotype (USNM); 1, Colombia, Cali, CIAT, Nov 1977, F. D. Bennett Collector, Pred. on *Orthezia* (USNM); 1, Colombia, Magd (Magdalena), Argelia, 28-IX-'35, Murillo No 107 (USNM); 1, Curaçao, Schottgatwee, July 1-5, 62, J Maldonado C (USNM); 3, British Guiana (Guyana), Georgetown, August 1953, Collector F.J. Simmonds (USNM); 1, Trinidad, *Orthezia*, C.I.E.16482 (BM); 7, Trinidad, St. Augustine (CNC); 2, Trinidad W.I., S/Grande, 16-4-1961, N. Gopaul Coll. (CNC); 4, Trinidad, Tunapuna, 2-4-I-59 (CNC); 6, Trinidad, Tunapuna, 6-I-1959 (CNC); 2, Trinidad, Tunapuna, Aug. 1-3, 1969, H. & A. Howden (USNM); 2, Venezuela, Aragua, El Limon, 450

m, 22-V-69, Predator adulto sobre escama en Croto, E. No. 16, Col. A. Notz (USNM).

Description. ♂, length 2.5 mm, width 2.0 mm; body oval, convex. Dorsal surface with head weakly alutaceous, shiny; pronotum and elytra shiny. Color dark brown except head yellow; pronotum yellow with 4 pale brown, indistinct spots, 1 triangular spot medially on each side of middle, 1 narrow, basomedian spot on each side of middle; elytron with 3 large, yellow spots, 1 irregularly rounded spot on disc near suture, 1 somewhat rectangular spot on lateral margin laterad of discal spot, 1 comma shaped subapical spot; antenna, mouthparts, propleuron, mesopleuron, median 1/2 of epipleuron, legs yellow; abdomen with median area of sterna 1-4 brownish yellow, lateral 1/4 and sterna 5-6 yellow. Head punctures fine, separated by less than a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on elytron, sparse medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely, coarsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron slightly oblique, not medially grooved, slightly descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 170). Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward middle, not basally stemmed, not reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, rounded along margin, apex recurved 2/3 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe 3/4 as long as paramere, wide, apex obliquely truncate, with angulate projection on one margin; paramere wide, tapered from apical 1/4 to rounded apex; (Fig. 172); siphon robust, apex sinuate, with membranous area, basal capsule with inner arm short, wide, outer arm wide, slightly shorter than inner arm (Figs. 173, 174).

♀ Similar to male except head reddish brown; pronotum may be immaculate, entirely yellow, or brown except lateral 1/3 yellow. Genitalia with beak of basal unit short; connecting duct short (Fig. 175).

Variation. Length 2.3 to 2.5 mm, width 1.8 to 2.0 mm. Male pronotal color varies from that described above to mostly dark brown with lateral 1/3 yellow (Figs. 167-169); elytral spots vary considerably in size and the subapical spot may not be comma shaped but irregularly rounded.

Etymology. The specific name refers to the resemblance to *H. donzeli*.

Remarks. Most specimens of *H. pseudodonzeli* have the comma-shaped subapical spot on each elytron, but female specimens often have this spot rounded. This species has been identified as *H. donzeli* in many collections, but *H. donzeli* is known only from Brazil, and the subapical spot on each elytron is transverse rather than comma shaped.

17. *Hyperaspis orthivora* n. sp.

Type material. Holotype ♂: Colombia, Valle (Valle del Cauca), Palmira, ICA, 4.iii.1991, J. Castillo, sp. EY-9A-91, ex. *Orthezia* sp., PIE 21639, *Hyperaspis* det. R.G. Booth (BM). Allotype ♀; same data as holotype (BM). Paratypes, 9. 5, same data as holotype (BM); 4, Colombia, Cali, CIAT, Nov 1977, F.D. Bennett Collector, Pred. of *Orthezia* (USNM).

Description. ♂, length 2.4 mm, width 2.0 mm; body oval, convex. Dorsal surface with head strongly, feebly shiny; pronotum slightly alutaceous, shiny; elytron shiny. Color yellow except pronotum with 5 pale brown spots, 2 triangular spots medially in anterior 1/2, 1 triangular, basal spot on each side of middle, 1 baso-median, oval spot anterior to scutellum; elytron pale mottled brown with 3 yellow spots, 1 large, oval spot near sutural margin in anterior portion of disc, 1 oval spot on lateral margin laterad of discal spot, 1 large, comma-shaped spot at apex, all spots feebly connected; pro-, meso-, metasterna dark reddish brown; abdomen with median area of sterna 1-4 dark brown, lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures as large as pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, separated by less than a diameter laterally. Punctures on abdominal

sterna 1-4 as large as on elytra, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely, coarsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, weakly descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 179). Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not quite reaching posterior sternal margin, slightly flattened along margin, apex angled forward 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 2/3 as long as paramere, apex obliquely truncate, with large, angulate projection on one margin; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 180); siphon slender, apically sinuate, apex with membranous area, basal capsule with inner arm short, slender, sinuate, outer arm long, wide, apically knobbed, basal border sinuate (Fig. 181).

♀ Similar to male except head reddish yellow; median 1/3 of pronotum reddish yellow. Genitalia with beak of basal unit short; connecting duct short (Figs. 182, 183).

Variation. Length 2.4 to 2.7 mm, width 2.3. Dark areas on dorsum and venter from light reddish brown to nearly black. Male with dark pronotal spots from described to dark reddish brown, basal spots joined along margin to form narrow band, anterior spots narrowly connected to the basal band (Figs. 176, 177). Elytral spots feebly connected, or strongly, definitely connected (Fig. 178).

Etymology. This specific name is a combination of the first 4 letters of the scale name *Orthezia*, and the Latin *vorator*, meaning devourer, referring to the scale-eating habits of this species.

R e m a r k s . The predominantly yellow color, contrasted with a brown or black elytral ground color, in combination with 3 yellow spots on each elytron, distinguish this species.

18. *Hyperaspis zonula* n. sp.

Type material. Holotype ♂: Brasil, Lagos, Rio do Sul, S. Cater (Santa Catarina), 14.I.1953, W. Wittmer (CAS). Allotype ♀: Bra-

zil, S.C. (Santa Catarina), Sao Joaquina, Boa Jesus Rd, 28.xii.1972, V.F. Eastop 13,890, Brit. Mus. 1976-97, sweeping (BM). Paratype: Brasil, (illegible word), 4496, Hist. Coll. (Coleoptera) Nr. 4496, Genus? spec. Brasil., Virmond., Zool. Mus. Berlin (ZMHB).

Description. ♂, length 3.0 mm, width 2.4 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, shiny; elytra shiny. Color yellow except head with vertex black; pronotum with narrow, basomedian brown band; elytron with suture narrowly brown, and brown, arcuate vitta extended from base inside humeral callus nearly to sutural margin on apical declivity (Figs. 184, 185); pro-, meso-, metasterna dark reddish brown; abdomen with median area of sterna 1-4 dark brown, lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, becoming contiguous laterally. Punctures on abdominal sterna 1-4 as large as on elytra, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, slightly grooved internally, strongly descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae widely separated at apex, convergent to base, not basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum barely perceptibly emarginate. Genitalia with basal lobe 5/8 as long as paramere, apex obliquely truncate, with large, angulate projection on one margin; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 186); siphon long, apically sinuate, apex with membranous area, basal capsule with inner arm long, inside margin notched, outer arm short, wide, dark brown, apically knobbed, basal border deeply emarginate (Fig. 187).

♀ Similar to male except pronotum with 1 faint, triangular spot on each side of middle in anterior 1/2. Genitalia with beak of basal unit short, extremely wide, batlike; connecting duct short (Fig. 188).

Variation. Length 3.0 to 3.2 mm, width 2.4 to 2.7 mm. Dark areas on dorsum and venter from light reddish brown to nearly black. ♂ with dark pronotal spots from described to dark reddish brown, basal spots joined along margin to form narrow band, anterior spots narrowly connected basal band. Elytral spots feebly connected or strongly, definitely connected.

Etymology. The specific name is from the Latin *zona*, meaning belt, or girdle, referring to the curved elytral vitta and rounded form.

Remarks. This is a distinctive species with an atypical color pattern. The pale dorsal background with a dark curved vitta on each elytron is similar to that of some species of the cocciduline genus *Zenoria* Mulsant, but not to any known species of South American *Hyperaspis*.

19. *Hyperaspis brethesi* n. sp.

Type material. Holotype ♂: 27622, Argentina, M. Garcia (Isla Martin Garcia), BA Aires (Buenos Aires), Korschefsky Collection 1952 (USNM). Allotype ♀: Argentina, Buenos Aires, Isla Martin Garcia, I-1938, M.J. Viana (USNM). Paratypes, 28. 19, same data as holotype; 2, same data as allotype; 1, Argentina, Buenos Aires, Isla Martin Garcia, 4-1937, M.J. Viana; 1. BS Aires, F. 1936 Col.M. Viana; 3, Argentina, Camargo, Nunenmacher Collection; 1, Argentina, Tantana, Chaco, 37374; 1 (Argentina) Cordoba, Alta (illegible name), III-1959, Daguerre, Argentina 1968, Colln. J. Daguerre (BM) (CAS) (MBR) (USNM).

Other specimens: 6. 1, Argentina, Corrientes, S. Tome; 1, Argentina, Misiones, Posadas, NLH Krauss; 1, Argentina, Salta, Oran; 3, Bolivia, Santa Cruz, 3-4 k N Agua Clara, 12 Oct. 2000, Wappes & Dozier (MBR) (USNM).

Description. ♂, length 2.1 mm, width 1.7 mm; body oval, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum slightly alutaceous, shiny; elytron shiny. Color yellow except pronotum with median 1/3 dark brown with yellow, eyelike spot on each side of middle; elytron yellow, speckled with brown dots instead of entirely dark brown above, elongate brown spot on disc at sutural margin, another elongate brown spot near suture on

apical declivity, humeral callus with small brown spot (Fig. 189); antenna, mouthparts, propleuron, mesopleuron, epipleuron, legs yellow; abdomen with median area of sterna 1-4 dark brown, lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, separated by 1 to 2 times a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to 2 times a diameter. Metasternal punctures much larger than on elytron, separated by a diameter medially, becoming dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely, coarsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat grooved internally, slightly descending externally, femoral depression deep. Antenna with 11 articles (Fig. 194). Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum slightly arcuate. Genitalia with basal lobe 3/4 as long as paramere, apex obliquely rounded, with large, angulate projection on one margin; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 196); siphon slender, apex curved, basal capsule with inner arm robust, apically knobbed, outer arm slightly shorter than inner arm, basal border emarginate (Figs. 197, 198).

♀ Similar to ♂ except head brown; pronotum brown except lateral 1/4 yellow, lacking central eyelike spots. Genitalia with beak of basal unit short; connecting duct short (Fig. 199).

Variation. Length 2.1 to 2.4 mm, width 1.7 to 1.8 mm. Dorsal color of pale phase varies from that described above to having either more or fewer dark brown "speckles"; brown spots on suture may be united with those on opposite elytron, creating 1 or 2 central elytral spots. Dark phase brown except head yellow; pronotum yellow with large, brown, basomedian spot, spot widely separated from anterior pronotal margin, apically emarginate, with 2 oblique, eyelike yellow spots in middle; elytron laterally bordered with yellow, curved vitta from scutellum at base to near sutural margin at apical

declivity, vitta connected to lateral border slightly anterior to apical declivity (Figs. 190-193).

Etymology. The species is named for Juan Brèthes, who contributed much to the classification of South American Coccinellidae.

Remarks. There are two color phases of this species; the paler being predominant among specimens examined is chosen as typical. The remaining specimens are described under "Other specimens." Both color phases of *H. brethesi* are distinctive and superficially very different. However, males of both have male pronota identical in color with the central, eyelike spots and identical genitalia. The pale form bears a slight resemblance to *H. operaria*, but the latter species is distinctly larger, more rounded, and lacks the characteristic brown, elytral "speckles".

Isla Martin Garcia, Buenos Aires, is the locality from which most specimens examined were collected.

20. *Hyperaspis rosariensis* n. sp.

Type material. Holotype ♂: Argentina, Salta, Rosario de Lerma, XI-10/14-1983, Malaise Trap, M. Wasbauer coll. (CDA).

Description. ♂, length 2.6 mm, width 2.0 mm; body oval, convex. Dorsal surface with head alutaceous, weakly shiny; pronotum slightly alutaceous, shiny; elytra shiny. Color black except head yellow; pronotum yellow with large, rectangular, basomedian spot, spot widely separated from anterior margin, lateral margin of spot slightly emarginated, elytron with 2 yellow spots, 1 small, round spot near suture anterior to middle of elytron, 1 small, oval, apical spot at posterolateral angle (Fig. 200), spot at posterolateral angle not shown); antenna, mouthparts, propleuron yellow; pro-, mesolegs reddish yellow except outer tibial margins brown; metafemur brown except apical 1/8 yellow; abdomen brown with lateral 1/8 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures slightly larger than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures much larger than on elytron, absent medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4

larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron slightly oblique, internally grooved, slightly descending externally, femoral excavations deep. Antenna with 11 articles. Protibia narrow, not flanged. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly truncate. Genitalia with basal lobe 2/3 as long as paramere, apex narrowly rounded, with rounded projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 201); siphon long, with apical membranous area, basal capsule with inner arm wide, shorter than outer arm, apically truncate (Figs. 202, 203).

♀ Not known.

Etymology. The species is named for the type locality.

Remarks. This species is similar to *H. bisignata* and *H. camargoi*, but male genitalia are quite different. In addition, dorsal punctation differs, with *H. bisignata* and *H. camargoi* having dense elytral punctures separated by less than to twice a diameter, distinctly larger than pronotal punctures. *Hyperaspis rosariensis* has elytral punctures separated by 1 to 3 times a diameter and only slightly larger than pronotal punctures.

21. *Hyperaspis siladesma* n. sp.

Type material. Holotype ♂: Brazil, Chapada, Acc. No. 2966, Nov. (CMP).

Description. ♂, length 2.1 mm, width 1.6 mm; body oval, slightly flattened. Dorsal surface with head strongly alutaceous, dull; pronotum shiny; elytra shiny. Color black except head yellow; pronotum yellow with large, somewhat rectangular, basomedian spot, spot widely separated from anterior margin, with lateral earlike projection, elytron with lateral border and discal spot yellow, discal spot anterior to middle, irregularly rounded, lateral border

irregular, widened opposite discal spot and at apex (Fig. 204, 205); antenna, mouthparts, propleuron yellow, pro- and mesolegs yellow; metaleg yellow with femur brown except apical 1/8 yellow; abdomen brown with lateral 1/8 reddish yellow. Head punctures hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by less than to about a diameter; elytral punctures larger than pronotal punctures, separated by less than to about a diameter. Metasternal punctures much larger than on elytron, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 smaller than on elytra, sparse medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron slightly oblique, internally grooved, slightly descending externally, femoral depressions moderately deep. Antenna with 11 articles. Protibia narrow, not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe 5/8 as long as paramere, apex narrowly rounded, with angulate projection on one margin; paramere wide, tapered from basal 1/4 to rounded apex (Fig. 206); (sipho lost except for basal capsule) basal capsule with inner arm slender, shorter than outer arm, outer arm wide, elongate, apically truncate (Fig. 207).

♀ Not known.

Etymology. The species name is an arbitrary combination of letters.

Remarks. *Hyperaspis siladesma* has an elytral color pattern similar to one of the color forms of *H. scutifera*, but that species occurs in northern Colombia and Venezuela and has 10-articled antennae.

22. *Hyperaspis octonotata* n. sp.

Type material. Holotype ♂: Colombia, Magd. (Magdalena), 12 mi. W. Sta. Marta, IV-28-1973, Campbell & Howden (CNC).

Description. ♂, length 2.9 mm, width 2.5 mm; body form round, slightly flattened. Dorsal surface with head dull, strongly alutaceous, pronotum and elytra shiny. Color yellow except pronotum with 4 median brown spots, anterior 2 spots triangular, basal 2 spots slightly triangular, widely separated anterior to scutellum; elytron with 4 oval, brown spots and sutural margin narrowly brown, 1 spot anterior to disc between suture and humerus, 1 spot on humerus, 1 spot on apical declivity inside sutural margin, 1 spot on apical declivity near lateral margin, sutural margin brown from scutellum to apex (Fig. 208, 209); prosternum with basal border and prosternal process pale reddish brown, pro- and mesosterna dark reddish brown, median 2/3 of abdominal sterna 1-4 pale reddish brown. Head punctures very fine, hidden in dense alutaceous sculpture. Pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, coarse, sparse medially, dense laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc feebly shiny, alutaceous, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae convergent toward base, joined at midpoint, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, deeply emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe nearly as long as paramere, wide, apex obliquely truncate, with rounded projection on one side; paramere short, wide, rounded to apex in apical 1/4 (Fig. 210); siphon robust, apex sinuate, with membranous area, basal capsule with inner arm long, slender, outer arm shorter and slightly wider than inner arm (Figs. 211, 212).

♀ Not known.

Etymology. The specific name is from the Latin *octo*, meaning eight, and *notata*, meaning mark, referring to the 8 brown marks on the elytra.

Remarks. The color pattern described above, with variations, is repeated many times in the Hyperaspinae genera *Hyperaspis* and *Cyra*, but within the *onerata* Group only *H. octonotata* and *H. campbelli* have that pattern.

23. *Hyperaspis campbelli* n. sp.

Type material. Holotype ♂: Colombia, Magd. (Magdalena), 12 mi. W. Sta. Marta, IV-29-1973, Campbell & Howden (CNC).

Description. ♂, length 2.4 mm, width 2.0 mm; body form round, slightly flattened. Dorsal surface with head dull, strongly alutaceous, pronotum and elytra shiny. Color yellow except pronotum with 4 median brown spots, anterior 2 spots triangular, basal 2 spots slightly triangular, widely separated anterior to scutellum; elytron with ground color in apical 2/3 reddish yellow (pink), with 4 brown spots, 1 small, elongate spot on suture anterior to middle, 1 narrow, elongate spot on suture in basal 1/2, 1 large, irregular spot on humerus, 1 large, round spot medially on apical declivity (Fig. 213); pro-, meso-, and metasterna reddish brown; basal 4 abdominal sterna pale reddish brown. Head punctures very fine, hidden in dense alutaceous sculpture. Pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, sparse medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc feebly shiny, alutaceous, finely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, deeply emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 1/2 length of paramere, apex obliquely rounded apically, with large, angulate

projection on one side; paramere short, wide, rounded to apex in apical 1/2 (Fig. 214); siphon slender, apex sinuate, with membranous area, basal capsule with inner arm long, slender, outer arm shorter, wider than inner, apex knobbed (Fig. 215).

♀ Not known.

Etymology. The species is named for one of the collectors of the type specimen.

Remarks. The color pattern of *H. campbelli* is similar to that of *H. octonotata*, but the oddly "pink" elytral ground color is unusual. In addition, the body form of *H. campbelli* is somewhat flattened and the brown elytral spots are of different shapes and are differently arranged, as illustrated.

24. *Hyperaspis colombiensis* n. sp.

Type material. Holotype ♂: Colombia, Valle (Valle del Cauca), Palmira, Candelaria, alt. 1020 m., 31.I.41, Murillo No 5484 (USNM).

Description. ♂, length 2.4 mm, width 2.0 mm; body oval, slightly flattened. Dorsal surface with head strongly alutaceous, dull; pronotum shiny; elytron shiny. Color yellow except pronotum with 4 brown spots, 2 triangular spots medially in anterior 1/2, 1 triangular, basal spot on each side of middle; elytron reddish yellow (pink) with 4 brown spots and suture narrowly brown except brown area wider on apical declivity, 1 small, elongate, oval spot near suture posterior to scutellum, 1 small, elongate, oval spot between suture and humeral callus near base, 1 large, irregular spot on humeral callus, 1, large, irregularly oval spot medially on apical declivity (Fig. 216); mouthparts reddish yellow; pro-, meso-, metasterna black; abdomen with median 1/3 of sterna 1-2 dark brown, remainder of abdominal sterna yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 as large as on elytra, sparse medially, becoming fine, dense laterally; sterna 5-6

finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, nearly impunctate. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, weakly descending externally, femoral depressions moderately deep. Antenna with 11 articles (Fig. 217). Prosternum with intercoxal carinae widely separated at apex, parallel, short, extended 1/2 distance to base. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 5/8 as long as paramere, apex obliquely truncate, with small, angulate projection on one margin; paramere wide, tapered to rounded apex in apical 2/3 (Fig. 218); siphon slender, curved down in apical 1/4, apex with membranous area, basal capsule heavily sclerotized, dark brown, with inner arm long, slightly curved, outer arm longer than inner, apically knobbed, basal border emarginate (Figs. 219, 220).

♀ Not known.

Etymology. The species is named for Colombia, where the holotype was collected.

Remarks. This species, known only from the holotype male, is characterized by the "pink" ground color of the elytron, unusual elytral spot arrangement, and short, parallel prosternal carinae. In addition, three elytral spots arranged in a transverse row across the base of each elytron is an unusual pattern in *Hyperaspis*.

25. *Hyperaspis dissidens* n. sp.

Type material. Holotype ♂: (Colombia), Villalobos, Barranca de Naranjo, ex: Café Finca, Coll. DJ Calvert & I. Solis, VI-12-73 (USNM). Paratypes, 2:, same data as holotype (USNM).

Description. ♂, length 2.7 mm, width 2.2 mm; body oval, slightly flattened. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, weakly shiny; elytron shiny. Color black except head yellow with vertex narrowly black; pronotum with lateral 1/3 yellow, yellow area with internal margin arcuate, an-

terior margin narrowly yellow; elytron with 2 yellow spots, 1 irregular, transverse spot on disc from near sutural margin to lateral margin, 1 obliquely oval, subapical spot, anterior margin of spot slightly emarginated with black (Figs. 221, 222); antenna, propleuron yellow; mouthparts reddish brown; proleg reddish yellow except basal $1/3$ of femur dark brown, mesoleg reddish yellow except anterior and posterior margins of femur, outer margin of tibia dark brown, metaleg dark brown except apex of femur, inner tibial margin and tarsus reddish yellow; abdomen with median area of sterna 1-5 dark brown, lateral $1/8$ and sternum 6 reddish yellow. Head punctures fine, hidden in alutaceous sculpture, separated by 1 to 2 times a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, becoming nearly contiguous laterally. Punctures on abdominal sterna 1-4 smaller than elytral punctures, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc, finely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, slightly grooved internally, not descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 223). Prosternum without intercoxal carinae (Fig. 9). Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved $1/2$ distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum slightly emarginate. Genitalia with basal lobe $5/8$ length of paramere, apex obliquely truncate, with small, angulate projection on one margin; paramere wide, tapered to rounded apex in apical $1/2$ (Fig. 224); siphon robust, straight apically, apex with membranous area, basal capsule heavily sclerotized, dark brown, with inner arm long, slender, apically hooked, outer arm as long as inner, wide, basal border sinuate (Figs. 225, 226).

♀ Not known.

Etymology. This specific name is from the Latin *dissidens*, meaning differing, referring to the absence of prosternal carinae.

Remarks. Prosterna without carinae are very unusual in *Hyperaspis* species. This character and the median, transverse elytral spot characterize *H. dissidens*.

26. *Hyperaspis uninotata* n. sp.

Type material. Holotype ♂: Brazil, Guanabara, Rio de Janeiro, X.1963, M. Alvarenga coll. (USNM).

Description. ♂, length 3.0 mm, width 2.4 mm; body rounded, slightly flattened dorsoventrally. Dorsal surface with head alutaceous, dull; pronotum alutaceous, feebly shiny; elytra shiny. Color yellow except pronotum with large, black, nearly rectangular basomedian spot in median 1/2; elytra medially black with broad yellow border, apex of black area emarginated with yellow on each side of suture (Fig. 227); pro-, meso-, metasterna black; abdomen reddish brown with lateral 1/8 and sterna 5-6 yellow. Head punctures fine, nearly invisible in alutaceous sculpture, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on elytron, coarse, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, feebly grooved internally, not descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 228). Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex feebly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 3/4 as long as paramere, apex obliquely rounded, with angulate projection on one margin; paramere wide, tapered from middle to rounded apex (Fig. 229); siphon slender, apex sinuate, with membranous area, basal capsule with inner arm robust, short, outer arm wide, longer than inner arm (Figs. 230, 231).

♀ Not known.

Etymology. The specific name is from the Latin *unicus*, meaning sole or singular, and *nota*, meaning mark, referring to the single black elytral macula.

R e m a r k s . *Hyperaspis uninotata* has a unique dorsal color pattern because the apical margin of the elytral black area is emarginated with yellow on each side of the suture. Other South American *Hyperaspis* species may have a similar appearance, but the black elytral area is differently shaped and ♂ genitalia are different in each instance.

27. *Hyperaspis onerata* (Mulsant, 1850)

Cleothera onerata Mulsant, 1850: 552.

Hyperaspis onerata: CROTCH 1874: 230; KORSCHESKY 1931: 193; BLACKWELDER 1945: 447; GORDON 1987: 29.

Type locality. Colombia. MNHP (lectotype here designated).

D e s c r i p t i o n . ♂, length 2.3 mm, width 1.8 mm; body form oval, flattened. Dorsal surface with head strongly alutaceous, dull: pronotum feebly alutaceous shiny: elytron shiny. Color yellow except pronotum with 2 triangular, black, anteromedian spots narrowly connected to transverse basomedian spot, basomedian spot narrowly irregular (Fig. 236); elytron with basal margin narrowly black medially, sutural margin narrowly black posterior to scutellum, widely black on apical declivity, lateral margin narrowly black from anterolateral angle nearly to suture at apex, joined to black sutural margin, 1 large, oval, discal spot on sutural margin of each elytron forming a single, large, round spot, 1 small black, oval spot posterior to humeral callus, 1 large, irregularly oval spot near lateral margin in apical 1/3 (Figs. 232, 233); pro-, meso-, metasterna black; abdomen black except outer 1/4 and sternum 5-6 reddish yellow. Head punctures fine, distinct, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, very sparse medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside post-coxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at right angle. Epipleuron flat, grooved internally, weakly descending externally, femoral de-

pression deep. Antenna with 11 articles (Fig. 238). Prosternum with intercoxal carinae widely separated at apex, tapered toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum truncate. Genitalia with basal lobe 5/8 length of paramere, strongly, obliquely truncate apically, with large, acutely angulate projection on one side; paramere wide, tapered to rounded apex in apical 1/2 (Figs. 239, 240); siphon slender, apically sinuate, with membranous area, basal capsule with inner arm wide, outer arm shorter than inner arm, basal border emarginate (Figs. 241, 242).

♀ Similar to male except head reddish yellow with vertex black. Beak of basal unit short; connecting duct short (Fig. 243).

Variation. Length 2.0 to 2.7 mm, width 1.9 to 2.2 mm. Dorsal dark spots vary from black to brown; median pronotal maculation may have anterior dark area separated from basal dark area (Fig. 237); elytron with tendency for lateral spots to coalesce with each other and the apical elytral margin, size of black elytral spots highly variable (Figs. 234, 235).

Geographical distribution: Northern South America, Caribbean Islands.

Specimens examined: 66. Colombia: Cali; Cauca, Puerto Tejada; Cartagena; Cundinamarca, Fusagasuga; Cundinamarca, Melgar; Huila, Campoalegre; Magdalena, Santa Marta; Tolima, Ibagué; Turbaco; Valle del Cauca, Andalucia; Valle del Cauca, Buga; Valle del Cauca, Palmira. Venezuela: Aragua, El Limón; Caracas Valley; Departamento Federal, Caracas (BM) (CNC) (USNM).

Remarks. *Hyperaspis onerata* is distinguished from other *Hyperaspis* species by the dorsal color pattern. The basal lobe of the ♂ genitalia with a very large, acutely rectangular lateral tooth is a character shared with only a few other species.

A ♀ type specimen in the MNHP is designated the lectotype to stabilize future usage of the name. Lectotype labels are "Type/Coll. Mniszech/*onerata*, *Cleothera*, Muls., Colombie, Type". A female specimen in the MNHP bearing identical labels is designated a paralectotype.

28. *Hyperaspis bicruciata* Mulsant, 1850

Hyperaspis bicruciata Mulsant, 1850: 664; CROTCH 1874: 230; KORSCHESKY 1931: 185; BLACKWELDER 1945: 446; GORDON 1987: 29.

Type locality. "Nouvelle-Grenade" (Colombia, Venezuela). UMZC (lectotype designated by GORDON 1987).

Description. ♂, length 2.4 mm, width 1.9 mm; body, oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum shiny; elytron shiny. Color black except head yellow; pronotum yellow with basomedian brown spot consisting of narrow, basal, transverse vitta with median, vaselike projection extended $2/3$ distance to anterior pronotal margin; elytron with 3 yellow spots, large, yellow discal spot connected to large, yellow lateral spot, and 1 large, transverse, apical spot (Figs. 244, 245); antenna, mouthparts, propleuron, legs reddish yellow; epipleuron reddish brown. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternum with punctures larger than on elytron, separated by a diameter medially, becoming contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctate. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral depressions moderate, not deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved $1/2$ distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe $2/3$ as long as paramere, sinuate, apex obliquely rounded, with small, acute projection on one margin; paramere oval, slender, tapered from basal $1/4$ to rounded apex; (Fig. 246); siphon long, robust, apically sinuate with membranous area, basal capsule with inner arm short, wide, outer arm slightly longer than inner arm, apically knobbed, basal border weakly emarginate (Figs. 247-248).

♀ Not known.

Geographical distribution: Northern South America.

Specimens examined: 1 (lectotype).

R e m a r k s . The resemblance of this species to *H. connectens* was commented on by both MULSANT (1850) and CROTCH (1874). *Hyperaspis bicruciata* is distinguished from *H. connectens* and other species by the peculiar, vaselike pronotal spot; elytral color pattern with median spots broadly connected; postcoxal line flattened along basal margin; and long, slender basal lobe of the male genitalia.

The lectotype was the only specimen examined.

joannae group

Species with convex body; frons and clypeus joined at abrupt angle; protibia narrow; epipleural depressions deep; ♂ genitalia with inner arm of siphonal basal capsule very long, outer arm very short or nearly absent (Figs. 259, 265), paramere wide or oval.

The basal siphonal capsule with a long inner arm and short to nonexistent outer arm is diagnostic for this group.

29. *Hyperaspis joannae* n. sp.

Type material. Holotype ♂: Colombia, Leticia, Amazonas, 700', July 8, 1970, H. & A. Howden (USNM).

D e s c r i p t i o n . ♂, length 2.5 mm, width 2.0 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, shiny; elytron shiny. Color black except head yellow; pronotum yellow with large, black, basomedian spot, spot widely separated from anterior pronotal margin; elytron with 4 spots, 1 large, reddish yellow, irregularly oval discal spot, 1 small, triangular spot on anterolateral angle, 1 small, irregularly oval spot on lateral margin medially, 1 transverse, subapical spot (Fig. 249, 250); antenna, mouthparts, propleuron, legs yellow; epipleuron reddish yellow; abdomen with median area of sterna 1-4 dark brown, lateral 1/4 and sterna 5-6 reddish yellow. Head punctures not visible in alutaceous sculpture; pronotal punctures fine, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter.

Metasternal punctures much larger than on elytron, sparse medially, separated by a diameter laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely, coarsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, strongly descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 251, basal article missing). Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum slightly arcuate. Genitalia with basal lobe short, 1/2 as long as paramere, wide, apex obliquely truncate, with large, rounded projection on one margin; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 252); siphon slender, apex curved upward, with membranous area, basal capsule, with inner arm long, slender, apically knobbed, outer arm very short, basal margin emarginate (Figs. 253, 254).

♀ Not known.

Etymology. This species is named for JoAnne Gordon, without whose influence and assistance one of us (RDG) would not be co-authoring this revision.

Remarks. Characters distinguishing *H. joannae* are the 4 elytral spots whose size and arrangement are not repeated elsewhere in this group or in the South American *Hyperaspis* fauna.

30. *Hyperaspis albopunctata* Crotch, 1874

Hyperaspis albopunctata Crotch, 1874: 229; KORSCHESKY 1931: 184; BLACKWELDER 1945: 446; GORDON 1987: 29.

Type locality Brazil, UMZC (holotype, GORDON 1987).

Description. ♂, length 2.8 mm, width 2.4 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, shiny; elytron shiny. Color black ex-

cept head yellow; pronotum yellow with large, black, basomedian spot, anterior margin of spot widely separated from anterior pronotal margin, narrowly emarginated with yellow apically, elytron with 2 pale yellow spots, 1 very small discal spot, 1 large spot at apex, apical spot transversely elongate, outer end tapered to acute apex (Figs. 255, 256); antenna, mouthparts, propleuron, legs yellow; epipleuron reddish brown; abdomen with median area of sterna 1-5 brown, lateral 1/8 and sterna 5-6 yellow. Head punctures fine, separated by about a diameter; pronotal punctures larger than on head, separated by a less than to twice a diameter; elytral punctures larger than pronotal punctures, separated less than to twice a diameter. Metasternal punctures much larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 257). Prosternum with intercoxal carinae widely separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe 1/2 as long as paramere, apex obliquely truncate, with rounded projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 258); siphon slender, long, apex sinuate, curved upward, basal capsule with inner arm very long, apically knobbed, outer arm nearly absent, basal margin sinuate (Figs. 259, 260).

♀ Similar to ♂ except head reddish brown with black vertex; pronotum with basomedial black spot extended to apical margin. Genitalia with beak of basal unit short, connecting duct short (Fig. 261).

Variation. Length 2.6 to 3.0 mm, width 2.4 to 2.5 mm. Pronotum of ♂ with basomedian spot apically emarginate or not.

Geographical distribution: Brazil.

Specimens examined: 16. Brazil: Minas Gerais, Monte Verde; São Paulo, Campos Jordão; São Paulo, Cantareira; Guarulhos, Sítio Bananal (USNM).

R e m a r k s . The dorsal appearance is rather elegant and distinctive within the genus.

31. *Hyperaspis apicaspis* n. sp.

Type material. Holotype ♂: Brazil, 56127 (illegible label), S. Paulo (São Paulo), Fry Coll. 1905.100., *Hyperaspis subapicalis* Crotch (handwritten), not *subapicalis* acc. to Fry coll. type. det. R.G. Booth 2003 (BM).

D e s c r i p t i o n . ♂, length 2.0 mm, width 1.5 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum alutaceous, dull; elytron shiny. Color black except head yellow; pronotum with lateral 1/4 yellow; elytron with 1 round spot at apex, spot widely separated from sutural margin (Figs. 262, 263); antenna, mouthparts, propleuron, legs reddish yellow; abdomen with median area of sterna 1-4 dark brown, lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, separated by 1 to 2 times a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, separated by less than a diameter laterally. Punctures on abdominal sterna 1-4 smaller than on elytra, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, sparsely, coarsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, slightly grooved internally, not descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe short, 1/2 as long as paramere, apex obliquely rounded, with small, angulate projection on one margin; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 264); siphon slender, s-shaped apically, apex with membranous area, basal capsule with inner arm long, slender,

apically knobbed, outer arm very short, apically knobbed, basal border emarginate (Figs. 265, 266).

♀. Not known.

Etymology. The specific name is a combination of the Latin *apiculus*, meaning apex or apical, and *-aspis*, the ending of *Hyperaspis*.

Remarks. *Hyperaspis apicaspis* has the same dorsal color pattern as 2 other species of this group. See remarks under *H. delicata*.

32. *Hyperaspis delicata* Almeida & Vitorino, 1997

Hyperaspis delicata Almeida & Vitorino, 1997: 213-216.

Type locality. Brazil, Paraná, Piraquara (Universidade Federal do Paraná).

Description. ♂, length 2.0 mm, width 1.4 mm; body elongate, oval, convex. Dorsal surface with head strongly alutaceous, dull: pronotum alutaceous, feebly shiny; elytra slightly alutaceous, shiny. Color black except head yellow; pronotum with lateral 1/4 yellow, median black area laterally emarginated with yellow; elytron with small, yellow, subapical spot near posterolateral angle (Fig. 267, 268); antenna, mouthparts, legs reddish yellow except metafemur yellowish brown; propleuron yellow; epipleuron dark reddish brown; abdomen brown with lateral 3/8 reddish yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, sparse medially, separated by a diameter or less laterally. Punctures on abdominal sterna much larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, finely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, feebly grooved internally, not descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 269). Protibia narrow, not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st

abdominal sternum not reaching posterior sternal margin, flattened along margin, apex recurved $3/8$ distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe $2/3$ as long as paramere, narrowed from base to apex, apex slightly, narrowly rounded, without projection on one margin; paramere wide, tapered to rounded apex in apical $1/2$ (Fig. 270); siphon long, slender, apically sinuate, with apical membranous area, basal capsule with inner arm long, narrow, irregularly shaped, outer arm nearly absent, basal border slightly emarginate (Figs. 271, 272).

♀ Similar to ♂ except head black.

Variation. Length 2.56 to 3.20, width 1.86 to 2.44 mm.

Geographical distribution: Southeastern Brazil.

Specimens examined: 12. Brazil: Paraná, Piraquara; Paraná, Colombo; Ribiero Pires; São Paulo, São Paulo (CAS) (DZUP) (USNM).

Remarks. Of the 3 species having black elytra with a single, yellow, subapical spot on each elytron, and male genitalia with inner arm of basal capsule extremely long, only *H. mimica* is distinguishable by an external character. *Hyperaspis apicaspis* and *H. delicata* are separable by differences in the basal lobe of the ♂ genitalia. The lobe is short, wide, and with a lateral angulation in the former species, and long, tapered from base to apex, and without a lateral projection on one side in the latter. *Hyperaspis mimica* also has ♂ genitalia with a distinctive basal lobe, but is externally distinguished by prosternal carinae that are narrowly separated at the apex, nearly parallel toward base, and do not reach basal sternal margin.

33. *Hyperaspis mimica* n. sp.

Type material. Holotype ♂: Country not on labels, 1st label illegible, R. Korschefsky cum typ. comp. (pink label), *Hyperaspis subapicalis* Cr. 1926 det. R. Korschefsky, Korschefsky Collection 1952 (USNM).

Description. ♂, length 2.4 mm, width 1.8 mm; body elongate, oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum alutaceous, feebly shiny; elytra slightly alutaceous, shiny. Color black except head yellow; pronotum with lateral $1/4$

yellow, median black area laterally emarginated with yellow; elytron with small, yellow, subapical spot near posterolateral angle (Fig. 273); antenna, mouthparts, propleuron, proleg yellow; mesoleg reddish brown except apical 1/4 of femur brown; metaleg, epipleuron brown; abdomen brown with lateral 3/8 reddish brown. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, sparse medially, separated by a diameter or less laterally. Punctures on abdominal sterna slightly larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, feebly grooved internally, slightly descending externally, femoral depressions deep. Antenna with 11 articles. Protibia narrow, not flanged. Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, extended 3/4 distance to basal sternal margin, not stemmed. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex abruptly angled 7/8 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum distinctly emarginate. Genitalia with basal lobe about as long as paramere, narrowed in apical 1/2 to slightly rounded apex, with slight, angulate projection on one margin; paramere long, slender, tapered to rounded apex in apical 1/2 (Fig. 275); siphon long, slender, apically sinuate, with apical membranous area, basal capsule with inner arm long, slender, regular in shape, outer arm very short, basal border slightly emarginate (Fig. 276, 277).

♀ Not known.

Etymology. The species name is from the Latin *mimus*, meaning imitate, referring to resemblance in color pattern to *H. apicalis* and *H. delicata*.

Remarks. In addition to characters discussed under *H. delicata*, *H. mimica* is distinguished by the larger size; comparatively small, dense, dorsal and ventral punctures; and postcoxal line on the basal abdominal sternum apically extended nearly to basal sternal margin.

Holotype specimen labels do not indicate country of origin, which anyway must be in Central or South America.

34. *Hyperaspis laterimacula* n. sp.

Type material. Holotype ♂: O. Bolivien (eastern Bolivia), Prov. Sara, J. Steinbach S.V. (ZMHB).

Description. ♂, length 1.8 mm, width 1.6 mm; body round, convex. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, shiny; elytron shiny. Color brown except head yellow; pronotum yellow with basomedian brown spot, anterior margin broadly yellow, lateral 1/4 yellow, basomedian spot broadly emarginated laterally; elytron with 5 yellow spots, 1 small, triangular spot laterad of scutellum, 1, small, round, median discal spot, and 3 large, oval, spots on lateral margin, 1 at humeral angle, 1 at middle, and 1 subapical (Figs. 278, 279); antenna, mouthparts, legs reddish yellow; propleuron, epipleuron yellow; pro-, meso-, metasterna dark reddish brown; abdomen with median area of sterna 1-4 reddish yellow, lateral 1/4 and sterna 5-6 yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely, coarsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, slightly descending externally, femoral excavations deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe short, 1/2 as long as paramere, apex obliquely rounded, with large, angulate projection on one margin;

paramere wide, tapered to rounded apex in apical 1/4 (Fig. 280); siphon long, slender, curved upward apically, apex with membranous area, basal capsule with inner arm long, slender, outer arm very short, nearly absent, basal border widely emarginate (Fig. 281).

♀ Not known.

Etymology. The specific name is a combination of the Latin *latus*, meaning side, and *macula*, meaning spot, referring to the 3 large, lateral spots on each elytron.

Remarks. *Hyperaspis laterimacula* has a siphonal capsule of the same type as the 3 preceding species, but is otherwise unlike them. It is recognized by a combination of small size, round body form, and 5 yellow spots on each elytron. In its elytral spots, *H. laterimacula* resembles *H. vredenburghi*, but the elytral spots of the latter species are much larger, and male genitalia differ significantly.

howdeni group

Hyperaspis species having 11-articled antennae; body flattened or convex; frons and clypeus joined at abrupt angle; protibia narrow; ♂ genitalia with paramere very slender, slightly widened in basal 1/4, tapered to narrowly rounded apex (Fig. 283).

The slender, tapered paramere is diagnostic for this group.

35. *Hyperaspis howdeni* n. sp.

Type material. Holotype ♂: Colombia, Magd. (Magdalena), Parque Tayrona, 21 mi. E. Sta. Marta, V-13-1973, Howden & Campbell (CNC).

Description. ♂, length 2.1 mm, width 1.3 mm; body oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum slightly alutaceous, weakly shiny; elytron shiny. Color black except head yellow; pronotum yellow with large, black, rectangular basomedian spot, spot widely separated from anterior pronotal margin; elytron with large, irregularly rounded, discal spot (Fig. 282); antenna, mouthparts, propleuron yellow; legs reddish yellow; abdomen with median area of sterna 1-5 dark brown, lateral 1/4 and sternum 6 reddish yellow. Head punctures fine, hidden

in alutaceous sculpture, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, sparse medially, becoming nearly contiguous laterally. Punctures on abdominal sterna 1-4 as large as elytral punctures, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent basally, stemmed, reaching basal pronotal margin. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum slightly emarginate. Genitalia with basal lobe as long as paramere, apex obliquely truncate, with distinct, angulate projection on one margin; paramere very slender, slightly widened in basal 1/4, tapered to narrowly rounded apex (Fig. 283); siphon robust, straight apically, apex with membranous area, basal capsule with inner and outer arms short, wide (Figs. 284, 285).

♀ Not known.

Etymology. The species is named for Henry Howden, one of the type collectors, and esteemed entomological colleague.

Remarks. *Hyperaspis* species with a single, discal, elytral spot are uncommon; in addition, *H. howdeni* is distinguished by the large, irregular shape of the discal spot and particularly by the very slender paramere of the male genitalia characteristic of this group.

36. *Hyperaspis chocoensis* n. sp.

Type material. Holotype ♂: Colombia, Chocó, Istmina, 21.VIII.'40, LM Murillo No. 5342 (USNM).

Description. ♂, length 2.3 mm, width 1.8 mm; body oval, slightly flattened, widest posterior to middle. Dorsal surface

with head weakly alutaceous, shiny: pronotum and elytron shiny. Color black except head yellow; pronotum yellow with large, baso-median spot not extended to anterior margin, elytron with 1 large, long, yellow spot medially from near base to apical declivity, outer border of spot emarginate around humeral callus (Fig. 286); antenna, mouthparts, propleuron yellow; legs yellow except basal 1/4 of pro- and mesofemura yellowish brown, basal 2/3 of metafemur brown; abdomen with median area of sterna 1-5 reddish brown, lateral 1/8 and 6th sternum yellow. Head punctures fine, separated by less than a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, coarse, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, nearly impunctate. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epi-pleuron oblique, medially grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 287). Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed. Protibia narrow, not flanged. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe 3/4 as long as paramere, wide, apex truncate, with angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Figs. 288, 289); siphon slender, apex sinuate, with membranous area, basal capsule, with inner arm narrow, outer arm wide, as long as inner arm (Figs. 290, 291).

♀ Not known.

Etymology. This species is named for the Department of Chocó, where the type series was collected.

Remarks. The large, elongate discal spot on each elytron is an excellent recognition character. The holotype was collected at the same place on the same date as the female holotype of *Hyperaspis istmina*, a species nearly identical in size and dorsal color pattern.

37. *Hyperaspis atra* n. sp.

Type material. Holotype ♂: Brazil, Rio de Janeiro, Murundu Campos, VIII, 1978, M. Alvarenga (CMP).

Description. ♂, length 1.8 mm, width 1.5 mm; body oval, convex. Dorsal surface with head alutaceous, weakly shiny; pronotum shiny; elytra shiny. Color black except head yellow; pronotum with apical 1/5 and lateral 1/6 yellow, elytron with 1 small, elongate yellow spot on anterolateral angle outside of humeral callus (Figs. 292, 293); antenna, mouthparts, propleuron yellow; epipleuron brownish yellow; pro-, mesolegs reddish yellow, basal 1/2 of femora brown; metafemur brown except apical 1/8 yellow; abdomen brown with lateral 1/4 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than a diameter; elytral punctures larger than pronotal punctures, separated by less than to a diameter. Metasternal punctures slightly larger than on elytron, separated by a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron slightly oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles. Protibia narrow, not flanged. Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum broadly, distinctly truncate. Genitalia with basal lobe slightly shorter than paramere, apex acute, with distinct, angulate projection on one margin; paramere wide in basal 1/2, slender, tapered to abruptly rounded apex in apical 1/2 (Fig. 294); siphon long, with apical membranous area, basal capsule with inner arm slender, outer arm slender, slightly shorter than inner arm, apically knobbed, basal border deeply emarginate (Figs. 295, 296).

♀ Not known.

Etymology. The species name is the Latin word *atra*, meaning black, referring to the mostly black dorsum.

Remarks. The black elytron with a single, small, yellow, humeral spot will distinguish *H. atra*.

38. *Hyperaspis recordata* Mulsant, 1850

Hyperaspis recordata Mulsant, 1850: 679.

Hyperaspis recordata: CROTCH 1874: 228 (as synonym of *Cleothera pavidata* Mulsant, 1850).

Hyperaspis pavidata ab. *recordata*: KORSCHESKY 1931: 193; BLACKWELDER 1945: 448.

Type locality. Brazil, UMZC (lectotype designated by GORDON 1987).

Description. ♀, length 2.6 mm, width 2.0 mm; body oval, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum shiny; elytra shiny. Color black except pronotum with lateral margin broadly and anterior margin narrowly yellow; elytron with 2 yellow spots, 1 small, round spot with basal margin truncated near scutellum, 1 small, transversely oval, subapical spot at posterolateral angle of elytron (Figs. 297, 298); antenna, narrow outer margin of propleuron yellow; mouthparts dark brown; legs reddish yellow except basal 2/3 of femur dark brown; abdominal sterna 1-5 dark brown with lateral 1/4 and sternum 6 reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by less than a diameter; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, separated by a diameter or less medially, becoming dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron slightly oblique, grooved internally, slightly descending externally, femoral depressions deep. Antenna with 11 articles. Protibia not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent toward base, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, slightly flattened along margin, apex recurved

3/8 distance to basal sternal margin. Fifth sternum with apex feebly emarginate. Genitalia with beak of basal unit longer than unit, very wide, curved in apical 1/2; connecting duct short (Figs. 302, 302).

♂: Similar to ♀ except apices of abdominal sterna 5 and 6 distinctly emarginate. ♂ genitalia with basal lobe slightly shorter than paramere, wide, apex broadly rounded, with large, distinct, angulate projection on one margin; paramere wide in basal 1/2, slender, tapered to abruptly rounded apex in apical 1/2 (Fig. 299); siphon long, with apical membranous area, basal capsule with inner arm slender, outer arm slender, slightly shorter than inner arm, apically knobbed, basal border moderately emarginate (Figs. 300, 301).

Variation. Length 2.4 to 2.6 mm, width 1.9 to 2.0 mm.

Geographical distribution: Brazil.

Specimens examined: 2. Brazil: Pernambuco (lectotype); Rio de Janeiro (CMP).

Remarks. There are several black species with two pale spots on each elytron, but this is the only one with one of the spots located next to the scutellum.

CROTCH (1874) considered *H. recordata* a synonym of the Mexican *H. pavidata* Mulsant, and his treatment was followed by both KORSCHESKY (1931) and BLACKWELDER (1945). Examination of many hyperaspidae species indicates very little overlap between Mexican and South American species; therefore, we consider *H. recordata* a valid species, probably restricted to northeastern South America.

Species not assigned to a group

Hyperaspis species with 11-articled antennae, and male genitalia differing from any established group and from each other. Hence, they are placed in a "group" of their own.

39. *Hyperaspis eupaleoides* Crotch, 1874

Hyperaspis eupaleoides Crotch, 1874: 224; KORSCHESKY 1931: 188; BLACKWELDER 1945: 447; GORDON 1987: 28.

Hyperaspis graphica Weise, 1902: 174; KORSCHESKY 1931: 190; BLACKWELDER 1945: 447. (**n. syn.**)

Type locality: of *eupaleoides*, Brazil, Minas Gerais (UMZC, lectotype designated by GORDON 1987); of *graphica*, Brazil (ZMHB).

Description. ♂, length 3.3 mm, width 2.7 mm; body form oval, convex. Dorsal surface with head strongly alutaceous, dull: pronotum shiny: elytron shiny. Color yellow except pronotum with 4 triangular brown spots, 2 spots in anterior 1/2 narrowly connected medially, 2 basal spots on each side of middle; elytron with narrow, brown sutural margin and 4 brown spots, 1 elongate, apically tapered spot in basal 1/2 near suture from near base to middle, 1 crescent shaped spot laterally from base across humeral callus nearly to middle, narrowly connected to irregularly shaped spot in apical 1/2, 1 small, free spot near lateral margin in apical 1/2, and 1 very small, subapical spot near sutural margin (Fig. 304); pro-, meso-, metasterna yellowish brown; abdomen yellowish brown except outer 1/4 and sterna 5-6 yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex shallowly emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, strongly descending externally, femoral depression deep. Protibia not flanged. Prosternum with intercoxal carinae widely separated at apex, parallel to basal 1/4, then convergent, not basally stemmed, reaching basal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 3/8 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum emarginate. Genitalia with basal lobe 3/4 length of paramere, apex narrowly, obliquely rounded, with large, weakly angulate projection on one side; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 305); siphon slender, curved upward at apex, with membranous area, basal capsule with inner arm long, narrow, outer arm wide, shorter than inner arm, basal border emarginate (Figs. 306, 307).

♀. Not known.

Variation. Length 3.0 to 3.3 mm, width 2.6 to 2.7 mm.

Geographical distribution: Brazil.

Specimens examined: 4. Brazil: "Brasil"; Minas Gerais; Rio de Janeiro (BM) (ZMHB).

R e m a r k s . *Hyperaspis eupaleoides* has a dorsal color pattern unlike that of any known *Hyperaspis* species, but similar to certain species of *Cyra*, *Eupalea* Mulsant, and *Psyllobora* Chevrolat.

The holotype of *H. graphica* is identical to the lectotype of *H. eupaleoides*; therefore, these are considered synonyms with *H. graphica* the junior. The holotype of the latter is labeled "Brazil (green paper)/*graphica* m/Syntypus *Hyperaspis graphica* Weise 1902, labelled by MNHUB 2004 (red paper)".

40. *Hyperaspis mariposa* n. sp.

Type material. Ecuador (illegible name) (ZMHB).

D e s c r i p t i o n . ♂, length 3.0 mm, width 2.5 mm; body form rounded, convex. Dorsal surface with head alutaceous, feebly shiny; pronotum shiny; elytron shiny. Color yellow except pronotum with dark brown, transverse, basomedian vitta with 2 slender, dark brown projections, 1 on each side of middle, extended anteriorly 1/2 distance to apical margin; elytron with irregular discal spot which, taken in conjunction with spot on opposite elytron, forms butterfly outline (Fig. 308); pro-, meso-, metasterna brownish black; abdomen reddish brown except outer 1/4 and sterna 4-6 yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 as large as on elytron, sparse medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epi-pleuron slightly oblique, weakly grooved internally, weakly descending externally, femoral depressions deep. Prosternum with intercox-

al carinae narrowly separated at apex, convergent toward prosternal base, basally stemmed, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe about as long as paramere, very slightly asymmetrical, slender, apex not oblique, rounded, with indistinct angulate projection on one side; paramere slender, tapered to rounded apex in apical 1/2 (Fig. 309); siphon short, robust, straight apically, apex with membranous area, basal capsule with inner arm short, wide, irregular in outline, outer arm narrower and shorter than inner arm (Figs. 310, 311).

♀ Not known.

Specimens examined. 1 (holotype).

Etymology. The specific name means butterfly in Spanish, referring to the butterfly-shaped elytral macula.

R e m a r k s . The large size, mostly yellow dorsum, and accurate depiction of a butterfly on the elytra distinguish this species.

41. *Hyperaspis simlaensis* n. sp.

Type material. Holotype ♂: Trinidad, Pt. of Spain (Port of Spain), from H. Caracicolo, *Hyperaspis* sp. (USNM). Allotype ♀: Trinidad, Montserrat, July 4.05, Aug. Busck Collector (USNM). Paratypes, 2. Trinidad, 1, same data as allotype except date June, 30.5 (USNM); 1, Trinidad, 250 m, Simla nr. Arima, 25.XI-2 XII.1977, W.R.M.Mason (CNC).

Other specimen: 1. Venezuela, Tiara, m 1200 (Edo. Aragua), 21 V 1967, Bordón leg. (CCM).

D e s c r i p t i o n . ♂, length 2.0 mm, width 1.6 mm; body oval, convex. Dorsal surface with head alutaceous, weakly shiny; pronotum shiny; elytra shiny. Color dark brown except head yellow; pronotum with narrow anterior margin and lateral 1/4 yellow, median brown area triangularly emarginated apically; elytron with 4 yellow spots, 1 triangular scutellar spot at base, 1 triangular discal spot near suture, 1 transversely oval spot on lateral margin laterad of scutellar spot, 1 comma shaped, subapical spot on apical decliv-

ity (Figs. 312, 313); antenna, mouthparts, propleuron, legs yellow; epipleuron yellowish red; prosternum mostly reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures slightly larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, sparse medially, dense, nearly contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron slightly oblique, grooved internally, slightly descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 314). Protibia flanged. Prosternum with intercoxal carinae narrowly separated at apex, convergent nearly to base, basal stem short, reaching basal margin. Abdominal sterna 2-5 with dense fluting in median 1/3. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum truncate. Genitalia with basal lobe about as long as paramere, apex narrowly rounded on one side, with small, angulate projection on one margin; paramere oval, tapered from basal 1/2 to rounded apex (Fig. 315); siphon slender, apically straight, with apical membranous area, basal capsule with inner arm long, slender, outer arm slender, as long as inner arm, apically knobbed, basal border broadly emarginate (Figs. 316, 317).

♀ Similar to ♂ except head with vertex reddish brown, frons and clypeus reddish yellow; apical pronotal margin entirely dark brown, lateral 1/5 yellow. Genitalia with beak of basal unit long; connecting duct short (Fig. 318).

Variation. Length 2.0 to 2.3, width 1.6 to 1.8. Elytron on one paratype with trace of small, reddish yellow spot at anterolateral angle.

Etymology. The species is named for a paratype locality.

Remarks. This is a handsome, highly polished, convex species distinguished by the presence of 4 yellow elytral spots on a reddish brown background, and the unique fluting on abdominal sterna 2-5. The comma-shaped apical spot on each elytron is formed by 2

joined spots, and specimens might be found with these spots distinctly separated. Also, the suggestion of a subhumeral spot on the anterolateral angle might be counted as a spot when distinct. If so, each elytron would have 5 spots and the species would not key out correctly.

42. *Hyperaspis lindae* n. sp.

Type material. Holotype ♂: Colombia, Cld (Caldas), Villamaria, alt. 2000 m, 12.II.41, Murillo No 5465 (USNM).

Description. ♂, length 2.6 mm, width 2.0 mm; body oval, convex. Dorsal surface with head alutaceous, weakly shiny; pronotum shiny; elytron shiny. Color yellow except pronotum with a large, black, median vitta on each side of middle, vitta narrowly separated, not reaching apical margin; elytron red with basal and apical margins narrowly black, 1 short, wide, black vitta extended from base past humeral callus, 1 small, round, black spot medially just anterior to apical declivity, 1 small, oval, black spot on sutural margin in basal 1/2 (Figs. 319, 320); venter of head, most of propleuron, pro-, meso-, metasterna black; abdomen with median area of sterna 1-5 black, lateral 1/8 and sternum 6 reddish brown. Head punctures fine, separated by less than to twice diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on pronotum, separated by about a diameter medially, less than a diameter laterally. Punctures on abdominal sterna 1-4 as large as pronotal punctures, sparse medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 321). Protibia not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent near base, basal stem short, reaching basal pronotal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum slightly emarginate.

Genitalia with basal lobe $7/8$ as long as paramere, apical $1/3$ slender, apex rounded, with large, angulate projection one margin; paramere wide, tapered to rounded apex in apical $1/2$ (Fig. 322); siphon robust, long, with large membranous area in apical $1/5$, basal capsule heavily sclerotized, dark brown, inner arm slender, long, outer arm wide, as long as inner arm, apically knobbed (Figs. 323, 324).

♀ Not known.

Etymology. The species is named for Linda Lawrence, illustrator for the Systematic Entomology Laboratory, USDA, Washington, DC, who has provided excellent illustrations of lady beetles for many publications.

Remarks. Elytral color is striking in this species, with black maculation on a red surface. In addition, the prosternal carinae are somewhat unusual because they do not converge until near the basal prosternal margin.

Species known only from females

Here we place those *Hyperaspis* species having 11-articled antennae and known only from the ♀ sex.

In many instances it is nearly impossible to correctly associate *Hyperaspis* ♂♂ and ♀♀ unless they are present in series or in large enough numbers so the connection can be detected.

43. *Hyperaspis c-nigrum* Mulsant, 1850

Hyperaspis c-nigrum Mulsant, 1850: 649; CROTCH 1874: 224; KORSCHESKY 1931: 186; BLACKWELDER 1945: 446; GORDON 1987: 28.

Type locality. Brazil, MNHP (lectotype here designated).

Description. ♀, length 3.4 mm, width 2.7 mm; body form oval, convex. Dorsal surface with head strongly alutaceous, dull; pronotum alutaceous, shiny; elytron shiny. Color yellow except pronotum with 4 triangular, brown spots, 2 spots in anterior $1/2$ narrowly connected to 2 basal spots on each side of middle; elytron with large, brown spot separated from all margins, spot with median yellow area narrowly connected to basal yellow border (Fig.

325, 326); pro-, meso-, metasterna reddish brown; abdomen yellowish brown except outer 1/4 and sterna 5-6 yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures smaller than on elytron medially, sparse, becoming coarse, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex shallowly emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, strongly descending externally, femoral depression deep. Prosternum with intercoxal carinae widely separated at apex, convergent nearly to base, basal stem short, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, rounded along margin, apex recurved 3/8 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum arcuate. Genitalia with beak of basal unit composed of 2 large segments with earlike, anterolateral projections, connecting duct very short (Figs. 327, 328)

♂. Not examined.

Geographical distribution: Brazil.

Specimens examined: 3. Brazil: "Brazil"; Minas Gerais (MNHP) (UMZC).

R e m a r k s . *Hyperaspis c-nigrum* is a large, distinctly patterned species known from 3 specimens, including the lectotype. Similar in size and coloration only to *H. eupaleoides*, *H. c-nigrum* is distinguished by the dorsal color pattern, as is the former species.

The ♀ lectotype here designated to stabilize future usage of this name is labeled "Muséum Paris, Bresil, Minas-Geraes a Goyaz, de Castelnau 19 - 47/168/ *Hyperaspis C-nigrum* Muls., auct. det.". Another specimen is designated as paralectotype and is labeled "Muséum Paris, des Mines."

44. *Hyperaspis sagittata* Crotch, 1874

Hyperaspis sagittata Crotch, 1874: 225; KORSCHESKY 1931: 195; BLACKWELDER 1945: 448; GORDON 1987: 28.

Type locality. Bogota, Colombia, UMZC (holotype, GORDON 1987).

Description. ♀, length 2.6 mm, width 2.2 mm; body form rounded, convex. Dorsal surface with head alutaceous, dull: pronotum weakly alutaceous, slightly shiny: elytron shiny. Color yellow except pronotum with 4 triangular, brown spots, 2 anterior spots in anterior 1/2 weakly connected to 2 basal spots on each side of middle; elytron with all margins narrowly dark brown, with 4 brown spots, 1 u-shaped spot in anterior 1/2 curved from base around humeral callus and back to base, 1 irregular spot on suture posterior to middle, angled postero laterally onto apical declivity and extended onto apical 1/4, 1 spot nearly lateral margin medially, 1 small, spot on suture at apex (Figs. 329, 330); pro-, meso-, metasterna reddish brown; abdomen yellowish brown except outer 1/4 yellow. Head punctures fine, distinct, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures smaller than on elytron medially, sparse, becoming coarse, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, descending externally, femoral depression deep. Prosternum with intercoxal carinae widely separated at apex, convergent nearly to base, basal stem short, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum arcuate. Genitalia with basal unit large, wide medially, tapered at each end, beak short, wide, connecting duct short (Fig. 331)

♂ Not known.

Geographical distribution: Colombia.

Specimens examined. 1 (holotype).

Remarks. *Hyperaspis sagittata* is a distinctly patterned species slightly resembling *H. colombiensis* and *H. campbelli*. It is known only from the ♀ holotype.

45. *Hyperaspis guilloryi* (Mulsant, 1850)

Cleothera guilloryi Mulsant, 1850: 1040.

Hyperaspis guilloryi: CROTCH 1874: 229; KORSCHESKY 1931: 190; BLACKWELDER 1945: 447; GORDON 1987: 29.

Type locality. Colombia, UMZC (lectotype designated by GORDON 1987).

Description. ♀, length 1.6 mm, width 1.3 mm; body form oval, rounded, convex. Dorsal surface with head slightly alutaceous, dull; pronotum shiny; elytron shiny. Color black except elytron dark brown with large, median, oval, yellow spot (Figs. 332, 333); antenna, mouthparts, propleuron, epipleuron, legs reddish brown; pro-, meso-, metasterna dark brown; abdomen brown except outer 1/4 and sterna 5-6 yellowish brown. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, becoming coarse, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex shallowly emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, descending externally, femoral depression deep. Antenna with 11 articles (Fig. 334). Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, rounded along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex truncate. Genitalia with beak of basal unit short, connecting duct short (Fig. 335)

♂. Not known.

Geographical distribution: Colombia.

Specimens examined: 2. Colombia: the lectotype; Huila, Garzón (USNM).

Remarks. This very small species with a single yellow spot on each elytron resembles only *H. howdeni*. *Hyperaspis howdeni* is distinctly larger with a much larger elytral spot.

The ♀ lectotype in the UMZC has lost an elytron, but the remaining elytron and body size match exactly a specimen from Colombia previously identified as *H. guilloryi* by E.A. Chapin in 1954.

46. *Hyperaspis pseudopavida* n. sp.

Type material. Holotype ♀: Brazil, 316, 80.23, *Cleothera pavida* M. Named by Mulsant (BM).

Description. ♀, length 2.2 mm, width 1.8 mm; body form oval, convex. Dorsal surface with head alutaceous, dull; pronotum shiny; elytron shiny. Color black except elytron with 3 small, yellow spots, 1 transversely oval spot at base next to scutellum, 1 rectangular spot on lateral margin posterior to humeral callus, 1 irregularly rounded spot on apical declivity near apical margin, widely separated from suture (Figs. 336, 337); antenna, mouthparts except maxillary palpus, narrow outer margin of propleuron, tibia yellow; maxillary palpus, epipleuron, femora dark brown; abdomen dark brown except outer 1/4 and sterna 5-6 yellowish brown. Head punctures fine, separated by less than to twice a diameter; pronotal punctures fine, larger than head punctures, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures fine, sparse medially, becoming very coarse, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, with coarse, cross striations, slightly descending externally, femoral depression deep. Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal margin. Protibia not flanged. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly emarginate. Genitalia with beak of basal unit large, as long as unit (Fig. 338).

♂. Not known.

Etymology. The species name refers to the resemblance to *Cleo-thera pavid*a Mulsant.

R e m a r k s . There are other black species with 3 pale spots on each elytron, but this is the only one with a single spot next to the scutellum. *Hyperaspis recordata*, described as a variant of *Cleo-thera pavid*a, also has a scutellar spot but only 2 elytral spots.

The holotype is a single ♀ in the BM collection identified by Mulsant himself as *Cleo-thera pavid*a Mulsant, a species he described from Mexican material. However, the BM specimen identified by Mulsant as *C. pavid*a was part of the Deyrolle collection that Mulsant examined in 1853; *C. pavid*a was described by Mulsant in 1850; therefore, the specimen described above cannot be type material of *C. pavid*a (R. Booth, pers. comm.).

47. *Hyperaspis istmina* n. sp.

Type material. Holotype ♀: Colombia, Chocó, Istmina, 31.VIII.'40, LM Murillo No. 5327a (USNM).

D e s c r i p t i o n . ♀, length 2.8 mm, width 2.3 mm; body oval, rounded, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum shiny; elytra shiny. Color black except head yellow; pronotum black with lateral 3/8 yellow; elytron with 1 large, yellow spot extended from humeral callus nearly to apex, spot narrow apically, irregularly widened to truncate apex (Fig. 339, 340); antenna, propleuron yellow; legs reddish yellow; abdominal sterna 1-4 black with lateral 1/3 and sterna 5-6 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, finely, sparsely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron flat, grooved internally, not descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 341). Protibia not flanged. Prosternum with intercox-

al carinae narrowly separated at apex, convergent nearly to basal sternal margin, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, rounded along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex weakly emarginate.

♂. Not known.

Etymology. The species is named for the holotype locality, and the name is used as a noun in apposition.

R e m a r k s . The elytral color pattern is similar only to that of *H. chocoi*, and distinguishes *H. istmina* from other *Hyperaspis* species.

48. *Hyperaspis satipoensis* n. sp.

Type material. Holotype ♀: Peru, Satipo, XI, 1941, coll. by Paprzycki, G.H. Dieke Coll'n.1965 (USNM).

D e s c r i p t i o n . ♀, length 3.0 mm, width 2.4 mm; body rounded, convex. Dorsal surface with head alutaceous, dull: pronotum shiny; elytra shiny. Color black except head yellow; pronotum yellow with basomedian black spot, lateral 1/4 of pronotum yellow, basomedian spot with small, obliquely oval, yellow spot on each side of middle at base; elytron with 3 yellow spots, discal spot near suture anterior to middle roughly triangular, broad, spot near lateral margin laterad of discal spot irregular in shape, large, comma shaped yellow spot on apical declivity (Fig. 342, 343); antenna, mouthparts propleuron, legs reddish yellow; abdominal sterna 1-4 black with lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 334, outer articles lost). Protibia not

flanged. Prosternum with intercoxal carinae widely separated at apex, convergent nearly to basal sternal margin, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex broadly arcuate. Genitalia with beak of basal unit short, back of unit heavily sclerotized; connecting duct short (Figs. 345, 346)

♂. Not known.

Etymology. The species is named for Satipo, Peru, the holotype locality.

R e m a r k s . Distinguishing characters for this species are based primarily on dorsal coloration. The pronotum with 2 obliquely oval, median spots at the base is unique with the genus. The 3 spotted elytron with a large, comma-shaped apical spot also differs from that of other species.

49. *Hyperaspis aberttha* n. sp.

Type material. Holotype ♀: Brazil, São Paulo, Capital, 21-X-31 Col. J.P.F., Korschefsky Collection 1952 (USNM).

D e s c r i p t i o n . ♀, length 3.3 mm, width 2.6 mm; body oval, convex. Dorsal surface with head alutaceous, dull; pronotum alutaceous, slightly shiny; elytra shiny. Color black except head yellow with vertex and narrow border next to eye black; pronotum black with lateral 1/4 yellow; elytron with 1 large, yellow, transverse, apical spot near sutural margin, inner margin of spot obliquely truncate (Figs. 347, 348); antenna, propleuron yellow; mouthparts dark brown; proleg reddish yellow; meso-, metaleg reddish yellow except basal 1/2 of femur dark brown; abdominal sterna 1-5 black with lateral 1/4 and sternum 6 reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, dense, becoming contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdomi-

nal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epi-pleuron oblique, grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 349). Protibia not flanged. Prosternum with intercoxal carinae narrowly separated at apex, convergent nearly to basal sternal margin, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved $3/8$ distance to basal sternal margin. Fifth sternum with apex broadly emarginate. Genitalia with beak of basal unit long; connecting duct long (Figs. 350, 351).

♂. Not known.

Etymology. The specific name is an arbitrary combination of letters.

R e m a r k s . Three other species - *H. apicaspis*, *H. delicata*, and *H. mimula* - have black elytra with a single, yellow apical spot. *Hyperaspis abertha* differs by the much larger size, and spot on elytron large, transverse, with an obliquely truncate inner margin.

50. *Hyperaspis circumclusa* n. sp.

Type material. Holotype ♀: Brazil, Taperina, Acc. No. 2966 (CMP). Paratype ♀: Brazil, Parà-Is. Marajò, Curraliño, III-VI.1988, leg. Gallizia (CCM).

D e s c r i p t i o n . ♀, length 2.2 mm, width 1.8 mm; body rounded, slightly oval, convex. Dorsal surface with head alutaceous, dull: pronotum slightly alutaceous, shiny; elytra shiny. Color reddish yellow except head yellow with yellowish brown clypeus; pronotum dark brown with lateral $1/5$ yellow; elytron reddish yellow except lateral and apical margins with wide yellow border from base nearly to suture at apex, sutural margin widely dark brown (Figs. 352, 353); pro-, meso- and metasterna reddish brown; basal abdominal sternum reddish brown medially, remainder of abdomen reddish yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron,

separated by a diameter medially, dense, becoming contiguous laterally. Punctures on abdominal sterna as large as on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles. Protibia not flanged (Fig. 354). Prosternum with intercoxal carinae widely separated at apex, convergent nearly to basal sternal margin, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly flattened along margin, apex recurved $3/8$ distance to basal sternal margin. Fifth sternum with apex broadly emarginate. Genitalia with beak of basal unit short, divided into 2 projections (Figs. 355, 356).

♂. Not known.

Etymology. The species is named for the lateral yellow border encircling nearly the entire body except the head.

R e m a r k s . No other known species of South American *Hyperaspis* has a similar color pattern. The lateral yellow border is the same width throughout, enhancing the circular aspect of the color pattern.

51. *Hyperaspis aemulata* n. sp.

Type material. Holotype ♀: Venezuela, ex Venezuela, Hoboken, N. J. (New Jersey), on *Cattleya*, Hob. (Hoboken) # 934 (specimen intercepted at customs in Hoboken, New Jersey) (USNM).

Description. ♀, length 3.4 mm, width 2.7 mm; body rounded, slightly oval, convex. Dorsal surface with head slightly alutaceous, shiny: pronotum shiny; elytra shiny. Color yellow except pronotum with large, black, basomedian spot extended nearly to anterior margin, lateral margins of spot deeply emarginated with yellow; elytron with 5 dark brown spots and sutural border dark brown in posterior $5/6$, sutural margin slightly widened in apical $1/3$, 1 small, narrowly oval spot between suture and humeral callus, 1 irregularly elongate spot extended from base across humeral callus, 1 oval spot at lateral margin before apical declivity, 1 elongate oval spot on apical declivity between suture and lateral spot, 1 transversely oval api-

cal spot connected to sutural border (Figs. 357, 358); pro-, meso-, metasterna dark brown; abdominal sterna 1-5 reddish brown except lateral 1/4 and sternum 6 yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, becoming dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, sparse medially, becoming fine, dense laterally, sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex emarginate, clypeus and frons abruptly joined. Epipleuron oblique, not grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 359). Protibia not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent 1/2 distance to base, stem long, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly flattened along margin, apex recurved 2/3 distance to basal sternal margin. Fifth sternum with apex feebly emarginate. Genitalia with beak of basal unit short, wide; connecting duct long (Fig. 360).

♂. Not known.

Etymology. The specific name is from the Latin *aemulor*, meaning to emulate, referring to the resemblance to other species of *Hyperaspis*.

Remarks. Distinguishing characteristics of *H. aemulata* are the large size, 5 dark spots on each elytron, suture with dark border, and postcoxal line on the basal abdominal sternum recurved 2/3 distance to apical sternal margin.

The dorsal coloration of this species slightly resembles that of *H. matronata*, and more closely, those of *Tenuisvalvae ecoffeti* and *T. notata*.

52. *Hyperaspis dispar* n. sp.

Type material. Holotype ♀: Brazil, Guanabara, Rio de Janeiro, X.1963, M. Alvarenga coll. (USNM). Paratype ♀: same data as holotype (USNM).

Description. ♀, length 3.4 mm, width 2.8 mm; body rounded, slightly oval, convex. Dorsal surface with head alutaceous, dull: pronotum shiny; elytra shiny. Color yellow except head with black spot on each side of vertex, frons with poorly defined, light brown area extended onto clypeus; pronotum with 5 dark brown spots, a large, triangular spot on each side of middle in apical 1/2, transverse basomedian vitta, and small, elongate, oval spot on each side near lateral margin; elytron with 5 spots and sutural margin dark brown, suture bordered from scutellum nearly to apex, 1 large, elongate oval, discal spot near suture in basal 1/2, 1 irregularly oval spot on humeral angle, 1 elongate oval spot on apical declivity near suture, 1 narrow, somewhat triangular spot near lateral margin in apical 1/2, 1 narrowly transverse spot at apex bordering suture (Figs. 361, 362); mouthparts, legs reddish yellow; pro-, meso-, metasterna black; abdomen reddish yellow except basal sterna black medially. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, separated by a diameter or less medially, by less than a diameter laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, nearly impunctate. Clypeus emarginate apically, clypeus and frons abruptly joined. Epipleuron oblique, grooved internally, descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 363). Protibia not flanged. Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex feebly emarginate. Genitalia with beak of basal unit absent; connecting duct long (Fig. 365).

♂. Not known.

Etymology. The specific name is the Latin *dispar*, meaning unlike or dissimilar, referring to the distinctive color pattern.

Remarks. This is a large, distinctively marked species not resembling any other member of *Hyperaspis*. Rather, it has the dor-

sal aspect of several species of the tribe Brachiacanthini, and also some species of the coccinelline tribe Synonychini.

53. *Hyperaspis histrionica* (Mulsant, 1850)

Cleothera histrionica Mulsant, 1850: 629.

Hyperaspis histrionica: CROTCH 1874: 222; KORSCHESKY 1931: 190; BLACKWELDER 1945: 447.

Type locality: "Carthagenae" (Cartagena, Colombia) (MNHL, lectotype here designated).

Description. ♀, length 2.4 mm; body form elongate, slightly convex. Color black except head dark brown; pronotum dark yellow with black border on median part of base, with triangular black spot fused at apex of central part of border, and small, black, rounded spot laterally; elytron black with yellow lateral border extended from humeral callus posteriorly, not reaching apex, with 6 yellow spots arranged in 3 rows, row 1 from humeral callus toward suture, row 2 median, and row 3 preapical, each row with 2 spots sometimes fused to each other or to lateral border (Figs. 366, 367); mouthparts, legs dark yellow; propleuron yellow; pro-, meso-, metasterna black; abdomen dark brown. Pronotum and elytron with equal size punctures, separated by about 3 times a diameter. Clypeal apex emarginate, clypeus and frons joined at right angle. Epipleuron with femoral depressions. Postcoxal line on 1st abdominal sternum incomplete ♂. Not known.

Variation. None observed.

Geographical distribution: known only from the type locality.

Specimens examined: 1, the lectotype.

Remarks. The species described above is recognized by the presence of 6 yellow, elytral spots arranged in 3 transverse rows.

Hyperaspis histrionica was described by Mulsant from specimens in the Dejean collection. Although Mulsant had more than one specimen when he described this species, only one remains in that collection. This specimen, labeled "Carthagenae, Lebas" is designated as the lectotype to stabilize future usage of this name.

This species is known only from the ♀ lectotype; hence, it is placed with species known only from that sex.

Hyperaspis tayronensis closely resembles *H. histrionica* in dorsal color pattern, but we consider them distinct species for the present.

Section II

Species with frons and clypeus smoothly, obliquely joined; protibia widened apically.

vredenburgi group

Species with body slightly flattened; frons and clypeus and clypeus smoothly, obliquely joined; protibia widened apically, slightly flanged; male genitalia with basal lobe narrowed in apical 1/4, apex rounded, with abrupt, hooklike projection on one side (Figs. 376, 376), paramere slender, oval; protibia slightly flanged.

Hyperaspis species with either 10-articled (*H. connectens*) or 11-articled antennae, and smoothly, obliquely joined frons and clypeus, the latter a character shared only with the *conclusa* group. Basal lobe of the male genitalia with an abrupt, hooklike projection on one side is diagnostic for the *vredenburgi* group.

54. *Hyperaspis ayacucho* n. sp.

Type material. Holotype ♂: Venezuela, Exp. Territ. Amazonas, Puerto Ayacucho, June 15, 1950, J. Maldonado Capriles Coll. (USNM). Paratype ♂: Venezuela, Exp. Territ. Amazonas, Mouth Cunucunuma, R., Apr. 2, 1950, J. Maldonado Capriles Coll. (USNM).

Description. ♂, length 2.3 mm, width 1.8 mm; body oval, slightly flattened. Dorsal surface with head alutaceous, weakly shiny; pronotum strongly alutaceous, dull; elytra alutaceous, weakly shiny. Color black except head yellow; pronotum black with anterior 1/6 and lateral 1/5 yellow, basal margin with black area narrowly, briefly emarginated with yellow laterally; elytron with broad, yellow border on basal, lateral and apical margins, basal border enlarged between scutellum and humeral callus, lateral border irregular, apical

border not reaching suture (Fig. 368); antenna, mouthparts yellowish brown; propleuron, epipleuron yellow; proleg with apical 1/3 of tibia, and anterior 1/2 of femur yellow; abdomen black with lateral 1/4 reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures slightly larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron slightly oblique, feebly grooved internally, slightly descending externally, femoral depressions deep. Antenna with 11 articles (Fig. 369). Protibia widened apically. Prosternum with intercoxal carinae narrowly separated at apex, parallel 2/3 distance to anterior prosternal margin, not stemmed, not reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe 3/4 as long as paramere, apex narrowly rounded, with small, angulate projection on one margin; paramere oval, tapered from basal 1/4 to rounded apex (Fig. 370); siphon robust, apically straight, with apical membranous area, basal capsule with inner arm long, slender, outer arm slender, as long as inner arm, apically knobbed, basal border slightly emarginate (Figs. 371, 372).

♀ Not known.

Etymology. The species is named for the holotype locality with the name used as a noun in apposition.

Remarks. Characters distinguishing *H. ayacucho* are parallel prosternal carinae not extended to anterior prosternal margin; extremely alutaceous, dull pronotal surface; and broad, yellow elytral border.

55. *Hyperaspis herrerae* n. sp.

Type material. Holotype ♂: Colombia, Magd. (Magdalena), Codazzi, Apr. 20, 1962, J. Herrera collector (USNM).

Description. ♂, length 2.4 mm, width 1.8 mm; body oval, slightly flattened. Dorsal surface with head alutaceous, weakly shiny; pronotum alutaceous, weakly shiny; elytron alutaceous, weakly shiny. Color reddish yellow except head yellow; pronotum with large, black, rectangular basomedian spot, spot widely separated from anterior pronotal margin, anterolateral angle with small projection; elytra with large, more or less triangular spot in middle, spot narrow at scutellum, widened posteriorly onto apical declivity, abruptly narrowed to suture before apex, small, oval, black spot on humeral callus (Fig. 373, 374); venter of head, pro-, meso-, metasterna black; propleuron yellow; abdomen with median area of sterna 1-5 dark brown, lateral 1/4 and sternum 6 reddish yellow. Head punctures fine, separated by less than to twice diameter; pronotal punctures larger than on head, separated by 1 to 3 times diameter; elytral punctures smaller than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures larger than on pronotum, sparse medially, becoming nearly contiguous laterally. Punctures on abdominal sterna 1-4 as large as pronotal punctures, dense medially, becoming fine, dense laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron flat, feebly grooved internally, not descending externally, femoral excavation moderate, not deep. Antenna with 11 articles (Fig. 375). Protibia widened apically. Prosternum with intercoxal carinae narrowly separated at apex, convergent near base, basal stem short, reaching basal pronotal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum slightly arcuate. Genitalia with basal lobe 3/4 as long as paramere, apex narrowly rounded, notched in apical 1/2 on one margin; paramere oval, tapered to rounded apex in apical 1/2 (Fig. 376); siphon slender, constricted before apex, apex with membranous area, basal capsule with inner and outer arms slightly elongate, wide (Figs. 377, 378).

♀ Not known.

Etymology. The species is named for J. Herrera, collector of the holotype specimen.

R e m a r k s . The large, triangular elytral spot is unique to this species, and elytral punctures smaller than pronotal punctures are rare in *Hyperaspis*: the elytral punctures are nearly always larger or at least equal in size.

56. *Hyperaspis vredenburgi* n. sp.

Type material. Holotype ♂: Brazil, Rio Negro, Manacapuru, July, 1935, G. V. Vredenburg, Brit. Mus. 1935-615 (BM). Allotype ♀: Same data as holotype (BM). Paratypes, 12. 9, same data as holotype (BM). 3, Trinidad, Caranage, Oct. 14, 1918. A-760, Harold Morrison (USNM).

Description. ♂, length 2.2 mm, width 1.7 mm; body oval, slightly flattened. Dorsal surface with head strongly alutaceous, dull; pronotum alutaceous, dull; elytra alutaceous, dull. Color black except head yellow; pronotum yellow with large, somewhat rectangular, basomedian spot, spot widely separated from anterior margin, basal margin of spot narrower than anterior margin, elytron with 3 yellow spots and lateral margin in apical 2/3 yellow, 1 large, transversely oval scutellar spot, 1 large, irregularly rounded, discal spot near suture connected to lateral yellow border, 1 large, transversely oval spot at apex, yellow lateral border irregular, abruptly widened near apex to join discal spot (Figs. 379, 380); antenna, propleuron, epipleuron yellow; mouthparts reddish brown; pro-, mesolegs reddish yellow; metaleg with femur brown except apical 1/8 yellow, tibia and tarsus yellow except outer margin of tibia brown; abdomen brown with lateral 1/8 reddish yellow. Head punctures fine, hidden in alutaceous sculpture; pronotal punctures larger than on head, separated by less than to 3 times a diameter; elytral punctures slightly larger than pronotal punctures, separated by 1 to 3 times a diameter. Metasternal punctures much larger than on elytron, separated by about a diameter throughout. Punctures on abdominal sterna 1-4 larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron nearly flat, internally grooved, not descending externally, femoral excavations moderate,

not deep. Antenna with 11 articles (Fig. 381). Protibia widened apically. Prosternum with intercoxal carinae narrowly separated, parallel, extended $1/2$ distance to basal margin. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved $5/8$ distance to basal sternal margin. Fifth sternum with apex feebly emarginate; 6th sternum slightly arcuate. Genitalia with basal lobe $3/4$ as long as paramere, apex narrowly rounded, with angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 382); siphon short, with membranous area, apically sinuate, basal capsule with inner arm slender, long, outer arm slender, as long as inner arm, apically truncate (Figs. 383, 384).

♀ Similar to male except head black; black spot on pronotum extended to apical margin. Genitalia with beak of basal unit short, connecting duct short (Figs. 385).

Variation. Elytron with yellow lateral border as described above or broken into 2 spots, 1 triangular spot at humeral angle, 1 apical spot joining discal spot.

Etymology. The species is named for the collector of the type series.

Remarks. Elytra with scutellar spots are unusual, and the elytral pattern combined with the short, parallel prosternal carinae distinguishes *H. vredenburghi*. In addition, the consistently dull dorsal surface, lateral metasternal punctures separated by a diameter, and simple protibia will distinguish *H. vredenburghi* from either *H. tayronensis* or *H. laterimaculata*, each of which also has 5 spots on each elytron.

This is another instance of a species described from Amazonian Brazil occurring on Trinidad, with no other localities known. *Tenuis-valvae unipunctata* shares the same distribution.

57. *Hyperaspis festiva* Mulsant, 1850

Hyperaspis festiva Mulsant, 1850: 659; CROTCH 1874: 230; GORHAM 1895: 196; WEISE 1922: 36; KORSCHESKY 1931: 188; BRÈTHES 1925a: 204; BLACKWELDER 1945: 447; GORDON 1987: 29.

Hyperaspis cincticollis Mulsant, 1850: 553; CROTCH 1874: 230; GORDON 1987: 29.

Cleothera cincticollis: GORHAM 1895: 195.

Hyperaspis festiva ab. *cincticollis*: KORSCHESKY 1931: 188; BLACKWELDER 1945: 447.

Hyperaspis lemniscata: Boheman, 1859: 205; CROTCH 1874: 227; BRÈTHES 1925b: 203 (synonym of *H. festiva*).

Hyperaspis festiva ab. *lemniscata*: KORSCHESKY 1931: 188.

Hyperaspis festiva var. *apicalis* Weise, 1885: 167; KORSCHESKY 1931: 188.

Hyperaspis juniapuca Brèthes, 1925b: 5; KORSCHESKY 1931: 290; BLACKWELDER 1945: 447. (**n. syn.**).

Type locality: of *festiva*, Brazil (UMZC, lectotype designated by GORDON 1987); of *cincticollis*, Colombia (MNHP, lectotype here designated); of *lemniscata*, unknown; of *apicalis*, Puerto Rico (ZMHB, lectotype here designated); of *juniapuca*, Brazil, Río Junia-puca (Amazones) (BM, holotype).

Description. ♂, length 2.0 mm, width 1.4 mm; body elongate, oval, slightly flattened. Dorsal surface with head slightly alutaceous, feebly shiny; pronotum alutaceous, dull; elytron alutaceous, slightly shiny. Color black except head yellow with vertex black; pronotum black with anterior border narrowly yellow, lateral 1/8 yellow, median black area deeply emarginated basally by extension of lateral yellow spot; elytron with lateral and apical margins narrowly, irregularly bordered with yellow, yellow border apically recurved onto apical declivity, apex enlarged, 1 triangular discal spot anterior to middle (Fig. 388); antenna, mouthparts, legs reddish brown; propleuron, epipleuron yellow; abdomen with median area dark brown, lateral 1/4 reddish yellow. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternum with punctures larger than on elytron, punctures separated by a diameter medially, lateral punctures separated by less than a diameter. Punctures on abdomen coarse, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc alutaceous, nearly impunctate. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron flat, internally grooved, slightly descending externally, femoral excavations moderate, not deep. Antenna with 11 articles (Fig. 397). Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, pinched medially, extended 3/4 distance to anterior prosternal margin, not stemmed, not reaching

basal margin. Protibia widened apically. Basal abdominal sternum with apical margin sinuate. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum truncate. Genitalia with basal lobe 7/8 length of paramere, tapered to narrowly rounded apex in apical 1/4, with abrupt, angulate projection on one margin; paramere narrow, tapered from basal 1/4 to rounded apex (Fig. 398); siphon robust, long, apex with membranous area, basal capsule with inner arm long, slender, outer arm shorter than inner arm, slender, curved, basal border deeply emarginate (Figs. 399, 400).

♀ Similar to male except head black. Genitalia with beak of basal unit short, connecting duct short (Fig. 401).

Variation. Length 2.0 to 2.7 mm, width 1.4 to 2.0 mm. Elytral color extremely variable, discal spot often narrowly or widely connected to spot on apical declivity; discal spot may be enlarged to contact lateral yellow border; lateral yellow border often broken before apex, leaving apical spot free; size of elytral spots variable (Figs. 386-396).

Geographical distribution: Mexico and Caribbean islands south to Argentina and Bolivia. Recorded in the literature from the United States, but not present there.

Specimens examined: 321. Many localities, specimens present in nearly every collection examined (BM) (CAS) (CDA) (CMP) (DEI) (MBR) (SMTD) (USNM) (ZMHB).

Remarks. *Hyperaspis festiva* is widely distributed throughout South America except Chile. It is frequently found and collected, and has a somewhat unstable color pattern. However, the pronotum with the median black area deeply emarginated basally by an extension of the lateral yellow border is an excellent, remarkably stable one. In addition, the prosternal carinae do not reach the basal sternal margin, and the discal spot on each elytron, when present, is nearly always triangular.

The lectotype of *H. cincticollis*, here designated to stabilize future usage of this name, bears the labels "Type/Coll. Mniszech".

The holotype of *H. juniapuca* has male genitalia identical to those of typical *H. festiva*, and we consider it a junior synonym of *H. festiva*. Two female syntypes of *H. festiva* var. *apicalis* are in

the ZMHB collection. The first of these, labeled "Portorico/*Hyperaspis apicalis* (handwritten)/ ex Coll. J. Weise", is designated as lectotype. The second syntype, bearing identical labels but lacking the handwritten name, is designated as paralectotype. A syntype of *H. festiva* in the DEI collection labeled "Brasil Schaum/Coll. Haag/Syntypus (pink paper)/*festiva* mls. typ" is designated as paralectotype.

58. *Hyperaspis germainii* Crotch, 1874

Hyperaspis germainii Crotch, 1874: 228; KORSCHESKY 1931: 189; BLACKWELDER 1945: 447; GORDON 1987: 29.

Type locality: Chile (UMZC, holotype, GORDON 1987).

Description. ♂, length 2.5 mm, width 1.8 mm; body elongate, oval, slightly flattened. Dorsal surface with head slightly alutaceous, shiny; pronotum alutaceous, feebly shiny; elytron slightly alutaceous, shiny. Color black except head yellow with black vertex and narrow border along eye black; pronotum with anterior margin narrowly yellow, anterolateral angle broadly yellow, yellow area nearly reaching posterolateral angle; elytron with basal yellow border extended to lateral margin and posteriorly onto apical declivity, then inward nearly to suture, 1 small, irregularly rounded, discal spot posterior to middle (Figs. 402, 403); antenna, mouthparts, epipleuron, proleg reddish yellow; propleuron yellow; meso- and metaleg reddish yellow with femora dark brown; abdomen with median area dark brown, lateral 1/4 dark reddish brown. Head punctures fine, separated by less than to twice a diameter; pronotal punctures as large as on head, separated by 1 to 3 times a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternum with punctures much larger than on elytron, punctures separated by a diameter medially, lateral punctures separated by less than a diameter. Punctures on abdominal sterna larger than on elytra, sparse on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside post-coxal arc shiny, nearly impunctate. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron slightly oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 404). Prosternum with

intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin (Fig. 405). Protibia widened apically. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum truncate. Genitalia with basal lobe nearly as long as paramere, apex narrow, obliquely rounded, with large, angulate projection on one margin; paramere narrow, tapered from basal 1/4 to rounded apex (Fig. 406); siphon slender, apex sinuate, with membranous area, basal capsule with inner arm long, slender, outer arm as long as inner arm, widened to apex, apically knobbed, basal border emarginate (Figs. 407, 408).

♀ Similar to ♂ except head black; anterior margin of pronotum black. Genitalia with beak of basal unit long, connecting duct short (Fig. 409).

Variation. Length 2.4 to 3.0 mm, width 1.8 to 2.4 mm. Apex of yellow border on elytron may be separated, forming a single spot on apical declivity.

Geographical distribution: Argentina, Chile.

Specimens examined: 24. Chile: Angol; Cauquenes; Chillan; Concepción; Escuadron; Colorada; Hualqui; Curico, Peidras Negras; El Radal, Cordillera Talca; Nuble, Estero Bulileo; Santiago (CAS) (CCM) (CMP) (MNHS) (MSNG) (USNM) (ZMHB).

Remarks. The Chilean *Hyperaspis* fauna is very limited, and *H. germainii* has a color pattern unlike that of other Chilean species, rendering it easily recognizable.

59. *Hyperaspis connectens* (Thunberg, 1808)

Coccinella connectens Thunberg, 1808: 157.

Hyperaspis connectens: MULSANT 1850: 662; CROTCH 1874: 230; KORSCHESKY 1931: 186; DOBZHANSKY 1941: 25; GORDON 1985: 473; GORDON 1987: 29.

Hyperaspis lengi Schaeffer, 1905: 144; DOBZHANSKY 1941: 25; GORDON 1985: 473.

Description. ♂, length 2.6 mm, width 1.9 mm; body elongate, oval, slightly flattened. Dorsal surface with head slightly alutaceous, shiny; pronotum alutaceous, feebly shiny; elytron slightly alutaceous, shiny. Color black except head yellow; pronotum yellow

with median 1/2 black, black area extended to anterior pronotal margin, lateral margins slightly emarginated with yellow; elytron with 2 large, yellow spots connected on apical declivity, 1 spot transverse on disc anterior to middle, 1 transverse apical spot separated from suture (Figs. 410, 411); antenna, mouthparts yellowish brown; propleuron yellow; legs reddish yellow except femora dark brown with apical 1/6 reddish yellow; abdomen with median area dark brown, lateral 1/4 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures as large as on head, separated by a less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternum with punctures much larger than on elytron, sparse medially, separated by less than a diameter laterally. Punctures on abdominal sterna larger than on elytra, sparse on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctate. Clypeal apex deeply emarginate, clypeus and frons smoothly, obliquely joined. Epipleuron flat, slightly grooved internally, not descending externally, femoral depressions moderate, not deep. Antenna with 10 articles (Fig. 413). Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, joined before base, basally stemmed, not reaching basal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/4 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum nearly truncate. Genitalia with basal lobe 3/4 as long as paramere, apex obliquely rounded, with large, angulate projection on one margin; paramere oval, tapered from basal 1/4 to rounded apex (Fig. 415); siphon slender, apex straight with membranous area, basal capsule with inner arm long, wide, outer arm as long as inner arm, basal border deeply emarginate (Figs. 416, 417).

♀ Similar to ♂ except head black, clypeus reddish yellow; anterior margin of pronotum black. Genitalia with beak of basal unit long, connecting duct short (Fig. 418).

Variation. Length 2.3 to 3.0 mm, width 1.7 to 2.4 mm. Elytron with yellow spots broadly or narrowly connected, or elytron entirely yellow except basal, sutural, and lateral border in apical 1/2 black (Fig. 412); ♀ head varies from clypeus narrowly reddish yellow to having reddish yellow area extended onto frons.

Type locality: of *connectens*, "Habitat in insula St. Eustachii" (type not examined); of *lengi*, Brownsville, Texas (USNM, lectotype designated by GORDON 1985).

Geographical distribution: Southern United States south through Central America and the Caribbean Islands to northern South America.

Specimens examined: 57 (including 3 from Venezuela). Venezuela. Barquisimento; Tocayo (Present in most collections).

R e m a r k s . The typical dorsal color pattern is distinctive for the South American fauna. Many specimens were examined, nearly all from areas other than northern South America. It appears that *H. connectens* is marginally established in coastal Venezuela.

This is the only species belonging to Section II with 10-articled antennae.

conclusa group

Hyperaspis species having 11-articled antennae; body dorsoventrally flattened; frons and clypeus smoothly, obliquely joined; epipleural depressions for reception of femoral apices moderate or shallow, never deep; protibia widened apically; basal lobe of male genitalia usually long, weakly asymmetrical (except *H. elegantissima*) (Figs. 426, 443); and most species with incomplete prosternal carinae. The extremely flattened *H. longula* and *H. prolata* are the only species observed in any group with the posterior margin of the basal abdominal sternum sinuate.

60. *Hyperaspis ingrata* (Mulsant, 1850)

Cleothera ingrata Mulsant, 1850: 644.

Hyperaspis ingrata: CROTCH 1874: 223; KORSCHESKY 1931: 190; BLACKWELDER 1945: 447.

Type locality. "Cayenne" (French Guiana) (MHNL, lectotype here designated).

D e s c r i p t i o n . ♀, length 2.4 mm; body short, oval. Color black except anterior border of pronotum yellowish red; elytron with

oval, elongate, reddish yellow spot (Fig. 419); mouthparts, legs, yellowish red; ventral surface blackish brown. Pronotum and scutellum with deep, coarse punctures separated by 2 or 3 times a diameter; elytron with punctures as large as on pronotum, separated by 3 to 5 times a diameter. Clypeal apex emarginate. Epipleuron flat, not internally grooved, not descending externally, femoral excavations moderate, not deep. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved. Genitalia with beak of basal unit long, connecting duct short (Figs. 420, 421).

♂ Not known.

Variation: none observed.

Geographical distribution: known only from the type locality.

Specimens examined: 1 (lectotype).

Remarks. This species is known only from the ♀ lectotype, and is readily distinguished from other members of Section II by the elytral color pattern and distribution.

The ♀ lectotype here designated to stabilize future usage of the name is labeled "Cayenne, Lacordaire."

61. *Hyperaspis funesta* (Germain, 1854)

Coccinella funesta Germain, 1854: 335.

Hyperaspis funesta: BRÈTHES 1923: 454; KORSCHESKY 1931: 189; BLACKWELDER 1945: 447.

Hyperaspis chilensis Crotch, 1874: 231; BRÈTHES 1923: 454 (as a synonym of *funesta*); KORSCHESKY 1931: 189; BLACKWELDER 1945: 447; GORDON 1987: 29.

Type locality: of *funesta*, "provincia de Santiago" (Chile) (MHNS); of *chilensis*, Chile (UMZC, lectotype designated by GORDON 1987).

Description. ♂, length 2.3 mm, width 1.7 mm; body elongate, oval, flattened. Dorsal surface with head slightly alutaceous, shiny; pronotum shiny; elytron shiny. Color black except head yellow; pronotum black with anterior and lateral borders narrowly yellow; elytron with 1 irregularly transverse, yellow spot medially on lateral margin, spot extended internally 5/8 distance to sutural margin (Figs. 422, 423); antenna, propleuron yellow; mouthparts,

epipleuron, proleg reddish yellow; propleuron, epipleuron yellow; pro- and mesolegs reddish yellow; metaleg with femur dark brown; abdomen dark brown except lateral 1/8 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures as large as pronotal punctures, separated by 1 to 2 times a diameter. Metasternum with punctures larger than on elytron, punctures absent medially, lateral punctures dense, becoming contiguous. Punctures on abdomen coarse, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctate. Clypeal apex emarginate. Epipleuron flat, not internally grooved, not descending externally, femoral excavations moderate, not deep. Antenna with 11 articles (Fig. 424). Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal sternal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe nearly as long as paramere, apex narrowly rounded on one side, with gradual, slightly angulate projection on one margin; paramere oval, tapered from basal 1/4 to rounded apex; (Fig. 426); siphon slender, long, apex with membranous area, basal capsule with inner arm long, slender, outer arm shorter than inner arm, narrow, basal border slightly emarginate (Figs. 427, 428).

♀ Similar to ♂ except head black; anterior pronotal margin black. Genitalia with beak of basal unit long, connecting duct short (Fig. 429).

Variation. Length 1.9 to 2.4 mm, width 1.5 to 1.7 mm. Male head entirely yellow or with black vertex; elytron with yellow spot occasionally separated from lateral margin.

Geographical distribution: Argentina, Chile.

Specimens examined: 49. Argentina: Chubut, El Hoyo; Rio Negro, El Bolson, Rio Ternerero. Chile: Aconcagua, Illapel; Aconcagua, Papudo; Cauquenes; Coquimbo, Rio Los Molles; Lican Ray, Cautin; Linares; Santiago, Apoquindo; Santiago, Guyacán Santiago, Renca; Santiago, San Jose; Santiago, Cerra Calan; Valdivia, Panqui-

pulla; Victoria. (BM) (CAS) (CCM) (CMP) (CNC) (GG) (MNHS) (SMTD) (USNM) (ZMHB).

R e m a r k s . This species occurs in Chile and western Argentina; it is the only species of *Hyperaspis* with a single yellow spot on each elytron. The ♂ genitalia differ little from those of *H. nana*, and the 2 species are otherwise very similar. *Hyperaspis nana* might be a color form of *H. funesta*, but that cannot be stated with certainty at present.

When CROTCH (1874) described *H. chilensis*, he was obviously unaware of GERMAIN's (1854) description of *H. funesta*, because he does not mention the latter name in his monograph. In addition, Crotch's type specimens of *H. chilensis* came from Germain himself. The BM has two specimens of this species here designated paralectotypes. The first specimen is labeled "37318/ Reed/ Type/ Chili/ *Hyperaspis chilensis* Crotch/ *Chilensis*/ Fry Coll 1905.100/?Syntype *Hyperaspis chilensis* Cr. det. R. Booth 2004." The second specimen is labeled "Reed/ Chili/ Fry Coll 1905.100/ ?Syntype *Hyperaspis chilensis* Cr. det. R. Booth 2004." The specimens are considered paralectotypes because they came from the Fry collection, which Crotch certainly had available to him as evidenced by his descriptions of several other species from that collection.

62. *Hyperaspis nana* Mader, 1957

Hyperaspis nana Mader, 1957: 82.

Type locality: Chile, Quillota (MHNS, holotype).

D e s c r i p t i o n . ♂, length 2.0 mm, width 1.4 mm; body elongate, oval, slightly flattened. Dorsal surface with head slightly alutaceous, shiny; pronotum shiny; elytron shiny. Color black except head yellow with vertex black; pronotum black with anterior and lateral borders narrowly yellow; elytron with lateral and apical margins narrowly, irregularly bordered with yellow, yellow border apically separated from elytral margin, 1 irregularly oval scutellar spot at base, 1 large, oval, median discal spot posterior to middle (Figs. 430, 431); antenna, mouthparts, propleuron, epipleuron yellow; proleg reddish yellow; mesoleg reddish yellow except posterior 1/2 of femur dark brown; metaleg dark brown; abdomen entirely

dark brown except basal sternum bright yellow outside of postcoxal arc, sterna 2-6 with narrow lateral margin reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures as large as pronotal punctures, separated by less than to twice a diameter. Metasternum with punctures larger than on elytron, punctures nearly absent medially, lateral punctures becoming contiguous. Punctures on abdomen coarse, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, densely punctate. Clypeal apex emarginate. Epipleuron flat, internally grooved, not descending externally, femoral excavations moderate, not deep. Antenna with 11 articles. Prosternum with intercoxal carinae narrowly separated at apex, convergent toward base, basally stemmed, reaching basal sternal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, rounded along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe as long as paramere, apex narrowly rounded on one side, with gradual, rounded projection on one margin; paramere oval, tapered from basal 1/4 to rounded apex; (Fig. 432); siphon slender, long, apex with membranous area, basal capsule with inner arm short, slender, outer arm as long as inner arm, wide, curved, apically knobbed, basal border deeply emarginate (Figs. 433, 434).

♀ Similar to ♂ except head black; anterior pronotal margin black. Genitalia with beak of basal unit long (Figs. 435, 436).

Variation. Length 2.0 to 2.3 mm, width 1.4 to 1.7 mm. Elytron varies from that described above to scutellar spot connected to lateral yellow border, or scutellar spot connected to lateral border and feebly connected to apical yellow border, with lateral border incomplete behind humeral callus, leaving small, triangular, yellow spot at antero-lateral angle of elytron, or discal spot and lateral border forming large, yellow spot in apical 1/2, spot sometimes with small, central, black spot.

Geographical distribution: Chile.

Specimens examined: 22. Chile: Aconcagua, Rio Blanco; Aconcagua, Papudo; Angol; Los Petos, (illegible name); Santiago, Cerro Calan, Las Condes; Chillan; Santiago, San Bernardo Valparaiso, La

Cruz. (CAS) (CCM) (GG) (MNHS) (USNM).

R e m a r k s : *Hyperaspis nana* is the only Chilean species with a scutellar spot on each elytron. The dorsal color pattern otherwise resembles that of *H. funesta*.

63. *Hyperaspis sphaeridioides* Mulsant, 1850

Hyperaspis sphaeridioides Mulsant, 1850: 665; CROTCH 1874: 231; BRÈTHES 1923: 454; KORSCHESKY 1931: 197; BLACKWELDER 1945: 448; GORDON 1987: 29.

Coccinella cruciata Germain, 1854: 336.

Hyperaspis cruciata: BRÈTHES 1923: 454 (as synonym of *sphaeridioides*); KORSCHESKY 1931: 197; BLACKWELDER 1945: 448.

Type locality: Chile. Type depository of *sphaeridioides*, MHNL (lectotype here designated); of *cruciata*, MHNS (lectotype here designated).

D e s c r i p t i o n . ♂, length 2.4 mm, width 1.7 mm; body elongate, oval, flattened. Dorsal surface with head slightly alutaceous, shiny; pronotum alutaceous, slightly shiny; elytron shiny. Color black except head yellow with vertex black; pronotum yellow with large, black, basomedian spot, spot widely separated from anterior margin, lateral margin tapered from apex to base; elytron with discal and apical yellow spots connected to median lateral and apical lateral spots, forming 2 irregular bands (Figs. 437, 438); antenna, propleuron, epipleuron yellow; mouthparts, legs brown; abdomen entirely dark brown except lateral 1/6 brownish yellow. Head punctures fine, separated by 2 to 3 times a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternum with punctures larger than on elytron, absent medially, lateral punctures becoming contiguous. Punctures on abdomen coarse, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, densely punctate. Clypeal apex emarginate. Epipleuron flat, internally grooved, not descending externally, femoral excavations shallow. Antenna with 11 articles (Fig. 441). Prosternum with intercoxal carinae narrowly separated at apex, parallel toward base, reaching 2/3 distance to sternal margin, not stemmed. Protibia widened apically. Postcoxal line on 1st abdominal sternum

reaching posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum weakly emarginate. Genitalia with basal lobe slightly shorter than paramere, apex narrowly rounded on one side, with gradual, slightly angulate projection on one margin; paramere oval, tapered from basal 1/2 to rounded apex; (Figs. 443, 444); siphon slender, long, apex with membranous area, basal capsule with inner arm short, slender, outer arm longer than inner arm, enlarged apically, basal border deeply emarginate (Figs. 445, 446).

♀ Similar to ♂ except head black; anterior pronotal margin black. Genitalia with beak of basal unit long, connecting duct short (Figs. 447, 448).

Variation. Length 2.3 to 2.7 mm, width 1.7 to 1.9 mm. Elytron varies from that described above to having elytral spots narrowly connected (Figs. 439, 440), to having spots on elytron broadly connected, forming large, lateral, yellow spot medially emarginated with black on inner border.

Geographical distribution: Chile.

Specimens examined: 247. Chile: many localities (BM) (CAS) (CCM) (CMP) (CNC) (GG) (MBR) (MNHS) (MSNG) (USNM).

Remarks. *Hyperaspis sphaeridioides* is another strictly Chilean species distinguished by the dorsal color pattern. Although variable, pronotal and elytral patterns do not overlap variations found in the other Chilean species.

The lectotype of *H. sphaeridioides* here designated to stabilize future usage of the name bears no labels.

64. *Hyperaspis conclusa* Weise, 1906

Hyperaspis conclusa Weise, 1906: 197; KORSCHESKY 1931: 186; BLACKWELDER 1945: 446.

Hyperaspis flavolineata Mader, 1957: 83. (**n. syn.**)

Type locality: of *conclusa*, Argentina, Tucuman (MBR, lectotype here designated); of *flavolineata*, Bolivia, Lago Titicaca, Copacabana, 3850 m (MHNS).

Description. ♂, length 2.2 mm, width 1.5 mm; body elongate, oval, flattened. Dorsal surface with head slightly alutaceous,

shiny; pronotum shiny; elytron shiny. Color black except head yellow; pronotum yellow with large, basomedian black spot, spot widely separated from anterior and lateral angles, 1 small, irregular, free brown spot in lateral 1/4 of pronotum; elytron vittate, lateral and apical margins with yellow border, median vitta extended from base inside humeral callus to apical border, vitta enlarged at base, narrow toward apex (Figs. 449, 450); antenna, mouthparts, propleuron, epipleuron yellow; legs reddish yellow; abdomen dark brown except lateral 1/5 and sterna 5-6 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternum with punctures larger than on elytron, punctures sparse medially, becoming dense, nearly contiguous laterally. Punctures on abdomen slightly larger than on elytron, sparse on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc shiny, sparsely punctate. Clypeal apex emarginate. Epipleuron flat slightly grooved internally, not descending externally, femoral excavations shallow. Antenna with 11 articles (Fig. 453). Prosternum with intercoxal carinae widely separated at apex, convergent toward base, basally stemmed, reaching basal sternal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, slightly flattened along margin, apex recurved 5/8 distance to basal sternal margin. Fifth sternum with apex broadly, weakly emarginate; 6th sternum weakly emarginate. Genitalia with basal lobe as long as paramere, apex narrowly rounded on one side, with gradual, rounded projection on one margin; paramere oval, tapered from basal 1/4 to rounded apex; (Fig. 454); siphon slender, long, apex with membranous area, basal capsule with inner arm long, slender, outer arm shorter than inner arm, wide, basal border emarginate (Figs. 455, 456).

♀ Similar to ♂ except head black; anterior pronotal margin black, basomedian black spot enlarged laterally to include free spot. Genitalia with beak of basal unit short, connecting duct short (Fig. 457).

Variation. Length 1.9 to 2.2 mm, width 1.4 to 1.5 mm. Pronotum may have lateral free spot absorbed by basomedian spot or be narrowly connected. Elytral ground color varies from black to brown; central vitta and lateral yellow border vary in width (Figs.

451, 452) with a single specimen from Valchete, Argentina, having vittae so wide the elytral ground color is yellow with brown vitta.

Geographical distribution: Southern South America.

Specimens examined: 33. Argentina: Cajamarca; Chaco, Fontana; Cordoba, Alta Gracia; Jujuy, San Juancito; La Rioja; Mendoza, Poterillos; Salta, Guemes; Valchete. Bolivia: Lago Titicaca, Copacabana; Saavedra, Santa Cruz. Brazil: Corumba. Uruguay: Artigas, Colonia Palma; Carrasco (BM) (CAS) (CMP) (MBR) (MHNS) (USNM).

R e m a r k s . Vittate species are rare in the South American *Hyperaspis* fauna, and *H. conclusa* resembles only *H. elegantissima* in this character. The latter species has very narrow elytral vittae, and ♂ genitalia with a short basal lobe strongly angulate on one margin. *Hyperaspis conclusa* has wide elytral vittae, and male genitalia with a basal lobe as long as the paramere, feebly angulate on one margin. A single ♀ specimen from Venezuela appears to be this species, but more likely represents an undescribed species.

The ♀ holotype of *Hyperaspis flavolineata* Mader appears to be identical to typical specimens of *H. conclusa*.

The lectotype of *H. conclusa*, here designated to stabilize future usage of the name, is labeled "Rep. Argentina, Prov. Tucuman, 5-III-1900, C. Bruch/TYPUS/*Hyperaspis conclusa* Weise". A paralectotype in the ZMHB is bears the same locality label with additional labels "*Hyperaspis conclusa* W./Syntypus *Hyperaspis conclusa* Weise, 1906, labeled by MNHUB 2004 (red paper)".

65. *Hyperaspis arida* n. sp.

Type material. Holotype ♂: Peru, Lambayeque, Roadside veg., 1 mile S.E. of town, 20.viii.1971, fertile irrigate (sic !) region in arid coastal desert, P.S. & H.L. Broomfield, B.M. 1971-486. (BM). Allotype ♀: same data as holotype (BM). Paratypes, 21: same data as holotype. (BM) (USNM).

D e s c r i p t i o n . ♂, length 2.4 mm, width 1.8 mm; body form oval, slightly flattened. Dorsal surface with head alutaceous, feebly shiny; pronotum alutaceous, slightly shiny; elytron shiny. Color yellow except head with black vertex; pronotum with basomedian

black spot, spot widely separated from anterior margin, with anterolateral, earlike projection, narrowed from apical 1/3 to base; elytron with base near scutellum and sutural margin black, 3 median spots present from base to apex, black sutural margin irregular, slightly expanded at apical declivity, 1 elongate spot from base to just across humeral callus, large, median spot at apical declivity, and 1 small, transverse, subapical spot joined to sutural margin (Fig. 458); pro-, meso-, metasterna black; abdomen dark brown except outer 1/4 and sterna 4-6 yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Pro- and mesosterna very coarsely punctured medially, punctures nearly contiguous. Metasternal punctures larger than on elytron, separated by a diameter medially, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, dense medially, becoming dense, fine laterally; sterna 5-6 finely, densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, densely punctured. Clypeal apex emarginate. Epipleuron flat, grooved internally, not descending externally, femoral depressions shallow, nearly absent. Prosternum with intercoxal carinae narrowly separated at apex, convergent nearly to basal margin, with short stem reaching margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum not extended to posterior sternal margin, slightly flattened along margin, apex recurved 2/3 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum truncate. Genitalia with basal lobe 3/4 length of paramere, apex narrowly, obliquely rounded, with large, weakly angulate projection on one side; paramere slender, tapered to rounded apex in apical 3/4 (Fig. 459); siphon robust, straight apically, apex with membranous area, basal capsule with inner arm short, wide, apically knobbed, outer arm wide, as long as inner arm, apically knobbed (Figs. 460, 461).

♀ Similar to ♂ except head black. Genitalia with basal unit slender, curved, beak composed of small, winglike projection on each side (Fig. 463).

Variation. Length 2.3 to 3.6 mm, width 2.4 to 2.6 mm. Elytron often with basal border entirely black from sutural margin to spot at humeral callus, incorporating that spot; remaining elytral spots vary slightly in size.

Etymology. The specific name is the Latin *aridus*, meaning dry, referring to the Peruvian coastal desert type locality.

Remarks. Superficially this species is a pale version of *H. festiva*. The pronotal maculation is particularly similar, but the shallow femoral depressions on the epipleuron, extremely coarse, dense pro- and mesosternal punctation, elytra with black spots on a yellow ground color, and basal unit of female spermathca with the peculiar winged beak distinguish *H. arida*.

66. *Hyperaspis elegantissima* Brèthes, 1925

Hyperaspis elegantissima Brèthes, 1925a: 206; KORSCHESKY 1931: 188; BLACKWELDER 1945: 447.

Type locality: Argentina, Estancia La Noria, Rio San Javier, Santa Fé (BM, holotype).

Description. ♂, length 2.0 mm, width 1.5 mm; body elongate, oval, convex. Dorsal surface with head slightly alutaceous, shiny; pronotum slightly alutaceous, shiny; elytron shiny. Color black except head yellow with black vertex; pronotum with anterior margin narrowly yellow, median black area with large, lateral ear-like projection in lateral 1/4; elytron with lateral and apical margins narrowly yellow, narrowly sinuate vitta on elytron from base inside humeral callus to apical yellow border (Fig. 466); antenna, propleuron, epipleuron yellow; mouthparts, pro- and mesoleg brownish yellow; metaleg dark brown; abdomen with median area of sterna 1-5 dark brown, lateral 1/4 and sterna 5-6 dark reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated less than to twice a diameter. Metasternum impunctate medially, lateral punctures larger than on elytron, separated by less than a diameter. Punctures on all abdominal sterna larger than on elytra, sparse on sterna 1-2, becoming more dense on sterna 3-6; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron flat, not internally grooved, not descending externally, femoral excavations nearly absent, only slight depressions pres-

ent. Antenna with 11 articles (Fig. 467). Prosternum with intercoxal carinae narrowly separated at apex, convergent from apex toward base, basally stemmed, reaching basal margin. Protibia widened apically. Postcoxal line on 1st abdominal sternum not reaching posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex truncate; 6th sternum truncate. Genitalia with basal lobe 3/4 as long as paramere, apex narrow, obliquely rounded, with large, angulate projection on one margin; paramere wide, tapered from middle to rounded apex; (Fig. 468); siphon slender, apex straight, basal capsule with inner arm long, slender, outer arm as long as inner arm, basal border deeply emarginate (Figs. 469, 470).

♀ Similar to ♂ except head black; anterior margin of pronotum black, lateral margin narrowly yellow, median black area without earlike projection. Genitalia with beak of basal unit long, connecting duct short (Fig. 471).

Variation. Length 1.8 to 2.0 mm, width 1.4 to 1.5 mm. Vitta on elytron often broken medially, width slightly variable (Figs. 464, 465).

Geographical distribution: Argentina.

Specimens examined: 5. Argentina: San Juan, San Juan City; San Luis, San Juan, Jachal; San Luis City; Salta; Salta, Rosario de Lerma. (USNM) (ZMHB).

Remarks. This is one of two truly vittate species in South America. It has typical characteristics of the *conclusa* group except for male genitalia, which have a basal lobe of the type found in the *onerata* Group. BRÈTHES (1925a) aptly named this species *H. elegantissima*.

BRÈTHES (1925b) specifically stated that he had a single specimen; therefore, that specimen is the holotype. The holotype in the BM collection is labeled "Type (orange bordered disc)/ Estancia la Noria, Rio San Javier, Santa Fe, Argentine/ G. E. Bryant 6.1.1912/ *Hyperaspis elegantissima* Brèthes/ J. Brèthes det. 1924."

67. *Hyperaspis longula* Weise, 1922

Hyperaspis longula Weise, 1922: 35; KORSCHESKY 1931: 101; BLACKWELDER 1945: 447.

Type locality: Argentina, Buenos Aires (MBR, lectotype here designated).

Description. ♂, length 2.6 mm, width 1.5 mm; body elongate, slender, nearly parallel sided, flattened. Dorsal surface with head alutaceous, feebly shiny; pronotum strongly alutaceous, dull; elytron alutaceous, slightly shiny. Color black except head yellow; pronotum black with lateral 1/6 yellow, yellow border emarginated by broad, earlike projection of black area; elytron with 3 yellow spots, 1 triangular spot on anterior portion of disc, 1 sinuate spot on lateral margin medially, 1 transversely oval, subapical spot (Figs. 472, 473); antenna, mouthparts, propleuron yellow; epipleuron reddish yellow; abdomen with median area dark brown, lateral 1/4 reddish brown. Head punctures fine, separated by a diameter or less; pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternum with punctures larger than on elytron, punctures separated by a diameter medially, lateral punctures separated by less than a diameter. Punctures on abdomen coarse, dense on sterna 1-4, becoming fine, dense laterally and on sterna 5-6; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, densely punctate. Clypeal apex emarginate. Epipleuron flat, not internally grooved, not descending externally, femoral excavations shallow, nearly absent. Antenna with 11 articles (Fig. 476). Prosternum with intercoxal carinae narrowly separated at apex, parallel 5/8 distance to anterior prosternal margin, not convergent, not stemmed, not reaching basal margin. Protibia widened apically. Basal abdominal sternum with apical margin sinuate. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex abruptly recurved, nearly reaching basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum feebly emarginate. Genitalia with basal lobe nearly as long as paramere, apex narrow, obliquely rounded, with angulate projection on one margin; paramere narrow, tapered from basal 1/4 to rounded apex; (Fig. 477); siphon slender, long, apex with membranous area, basal capsule with inner arm long, slender, outer arm much shorter than inner arm, widened to apex, basal border emarginate (Figs. 478, 479).

♀ Similar to ♂ except head black. Genitalia with beak of basal unit long, connecting duct short (Fig. 480).

Variation. Length 2.6 to 3.0 mm, width 1.5 to 1.7 mm. Elytral color pattern varies from that described above to having the discal and lateral spots narrowly connected, or with discal and apical spots broadly connected (Fig. 474), and lateral margin narrowly bordered with yellow, connected to subapical spot, or lateral margin yellow, connected to apical spot with discal spot free (Fig. 475).

Geographical distribution: Argentina, Brazil.

Specimens examined: 22. Argentina: Buenos Aires; Buenos Aires, Delta; Buenos Aires, San Fernando; Chaco, Dep. Resistencia; Misiones; Tigre. Brazil: Corumba; Rio de Janeiro (BM) (CMP) (MBR) (USNM).

Remarks. *Hyperaspis longula* is one of the few long, slender, flattened species in South America. It is distinguished by the body shape; short prosternal carinae; sinuate apical margin of the basal abdominal sternum; and nearly complete postcoxal line on basal sternum. See remarks under *H. prolata*.

The lectotype, here designated to stabilize usage of the name, bears the labels "Rep. Argentina, Prov. Buenos Aires, 10-X-1906, C. Bruch/ Typus/ *Hyperaspis longula* Ws."

68. *Hyperaspis prolata* n. sp.

Type material. Holotype ♂: Argentina, Salta, Guemes (MBR). Allotype ♀: Bolivia, Dept. S. Cruz (Santa Cruz), 450 m, Umg Buenavista, Steinback coll., *Hyperaspis* n. sp., Korschefsky Collection 1952 (USNM). Paratypes, 2. Argentina, Chaco, Dep. Resistencia, X-XII-935 J. B. Daguerre 39749; Brazil, Chapada, Acc. No. 2966, Augst. (CMP) (MBR).

Description. ♂, length 2.6 mm, width 1.6 mm; body elongate, slender, nearly parallel sided, flattened. Dorsal surface with head strongly alutaceous, dull; pronotum strongly alutaceous, dull; elytra alutaceous, weakly shiny. Color black except head yellow with black vertex; pronotum yellow with median, black, transverse spot, basal margin of black spot deeply scalloped with slender, median stem extended to margin anterior to scutellum; elytron with yellow lateral border in basal 2/3, border enlarged at apex, 1 round discal spot near suture anterior to middle, 1 slender, comma shaped api-

cal spot at apex (Fig. 481, 482); antenna, mouthparts, legs reddish yellow; propleuron, epipleuron yellow; abdomen with sterna 1-4 dark brown except lateral 1/4 and sterna 5-6 reddish yellow. Head punctures fine, separated by less than to twice a diameter; pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures larger than on elytron, sparse medially, dense, contiguous laterally. Punctures on abdominal sterna larger than on elytra, dense medially, becoming fine, dense laterally, sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc alutaceous, coarsely, sparsely punctured. Clypeal apex emarginate. Epipleuron flat, feebly grooved internally, not descending externally, femoral depressions shallow. Antenna with 11 articles (Fig. 483). Protibia widened apically. Prosternum with intercoxal carinae narrowly separated at apex, parallel 5/8 distance to anterior prosternal margin, not convergent, not stemmed, not reaching basal margin. Postcoxal line on 1st abdominal sternum reaching posterior sternal margin, flattened along margin, apex abruptly recurved 3/4 distance to basal sternal margin. Basal margin of 1st abdominal sternum medially sinuate. Fifth sternum with apex broadly, weakly emarginate; 6th sternum truncate. Genitalia with basal lobe as long as paramere, apex truncate, without projection on one margin; paramere wide, tapered from basal 1/2 to rounded apex (Fig. 485); siphon long, slender, apically straight, with apical membranous area, basal capsule with inner arm long, slender, pinched near base, outer arm shorter than inner arm, wide, basal border slightly emarginate (Figs. 486, 487).

♀ Similar to ♂ except vertex of head broadly black, with narrow, median projection extended anteriorly to clypeal apex. Genitalia with beak of basal unit short, wide, with lateral earlike projections (Figs. 488-490)

Variation. Length 2.6 to 2.8 mm, width 1.6 to 1.8 mm. Head of ♂ paratype with black vertex narrowly, medially emarginated with yellow.

Etymology. The specific name is the Latin *prolatus*, meaning elongated, referring to the long, slender body form.

Remarks. *Hyperaspis longula* and *H. prolata* are morphologically similar species sharing several synapomorphies such as flat,

elongate, slender body; parallel prosternal carinae not reaching basal prosternal margin; sinuate apical margin of basal abdominal sternum; and postcoxal line on 1st abdominal sternum abruptly recurved apically, extended nearly to basal sternal margin. They differ from each other in type of male genitalia, and externally by the pronotal color pattern, with *H. prolata* having a central black spot and the posterior border scalloped; *H. longula* having a large, basomedian black spot at basal margin of pronotum.

Genus *Tenuisvalvae* Duverger, **n. stat.**

Hyperaspis (*Tenuisvalvae*) Duverger, 1989: 148.

Type species: *Hyperaspis bisquinquepustulata* (F.) (*H. raynevali* Mulsant), by monotypy.

Description. Hyperaspini with description as for *Hyperaspis* except antenna always with 11 articles (Figs. 493, 497, 501, 509, 516, 524, 531, 538, 545); ultimate maxillary article slightly emarginate apically; mandibulary retinaculum strongly curved, apex rounded; clypeus and frons joined at feeble angle; protibia narrow, not flanged; metendosternite with anterior tendons of fork not curved toward middle (Fig. 546); postcoxal line on 1st abdominal sternum extended to, or nearly to, posterior sternal margin, apex recurved; apex of female abdominal sternum 6 triangular; ♀ genitalia with genital plates extremely long, slender (Fig. 494).

Remarks. DUVERGER (1989) listed a series of differentiating characters for *Hyperaspis* and *Tenuisvalvae* derived from a comparison of *Hyperaspis galliae* Duverger and *Tenuisvalvae raynevalii* Mulsant (*bisquinquepustulata* F.). Some of these characters fail when examples of a variety of species of both genera are examined; characters considered to be of value are used in the above description. No good character for separating males of these two genera has been found. The form of the apical maxillary article may be useful but is extremely difficult to see without dissection, and metendosternite differences are not consistent for the entire fauna. Characters used by Duverger that fail when many species are compared are the shape of the siphonal capsule and form of the postcoxal line. The postcoxal line is said by Duverger to be of the *Parascymnus* Chapin

type. However, examination of the postcoxal line of *T. raynevali* (type species) shows it apically recurved as in *Hyperaspis*, not apically parallel to the hind sternal margin as in *Parascymnus*.

Ten species are recognized as members of this genus.

KEY TO SPECIES OF *TENUISVALVAE*

- 1(2). Elytron red with narrow black border on all margins except sutural margin 10. *gnoma*, n. sp.
 Elytron with pale or dark spots 2
- 2(1). Elytral color primarily black or brown with yellow or orange spots. 3
 Elytral color primarily yellow with black or brown spots 8
- 3(2). Each elytron with 1 spot 4
 Each elytron with 2 or more spots. 5
- 4(3). Elytron with spot at center of disc (Fig. 491)
 1. *unipunctata* (Crotch)
 Elytron with spot at extreme apex (Fig. 495)
 2. *peregrina* (Mulsant)
- 5(3). Elytron with 2 spots, one median and one at apex (Fig. 499) 3. *deyrollei* (Crotch)
 Elytron with 3 or more spots 6
- 6(5). Elytron with 5 spots (Fig. 513) 5. *bisquinquepustulata* (F.)
 Elytron with 3 spots 7
- 7(6). Elytron with one elongate discal spot, one triangular spot laterally at middle and one large, somewhat rounded apical spot (Fig. 426) 8. *caucaensis*, n. sp.
 Elytron with small basoscutellar spot, one humeral spot at base, and an elongate, curved spot at apex (Fig. 543)
 9. *bromelicola* (Sicard)
- 8(2). Elytral suture black; each elytron with black, c-shaped macula extended from center of suture posteriorly to

- apical 1/4, and slender, elongate spot extended from base inside humerus to beyond humeral callus, sometimes connected to median c-shaped mark (Fig. 629)
. 7. *parenthesis*, n. sp.
- Elytron variably marked but never with c-shaped macula 9
- 9(8). Elytron with 3 discrete black spots (Fig. 506)
. 4. *notata* (Mulsant)
- Elytron with 2 discrete black spots (Fig. 522)
. 6. *ecoffeti* (Mulsant)

1. *Tenuisvalvae unipunctata* (Crotch, 1874), n. comb.

Hyperaspis unipunctata Crotch, 1874: 230; KORSCHESKY 1931: 199; BLACKWELDER 1945: 448; GORDON 1987: 20.

Type locality. Santarem (Brazil) (UMZC, holotype, GORDON 1987).

Description. ♀, length 2.3 mm, width 1.4 mm; body form round, convex. Dorsal surface with head alutaceous, dull; pronotum slightly alutaceous, elytron shiny. Color black except pronotum with small, triangular, anterolateral spot nearly reaching basal margin; elytron with large, irregularly rounded, yellow spot just anterior to middle of elytron (Figs. 491, 492); antenna, mouthparts, and legs reddish brown except protibia yellow; propleuron yellow. Head punctures fine, separated by a diameter or less. Pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by a diameter or less. Metasternal punctures larger than on elytron, sparse medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex emarginate. Epipleuron oblique, grooved internally, externally descending, femoral excavations deep. Antenna with 11 articles (Fig. 493). Prosternum with intercoxal carinae convergent toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to

posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate. Genitalia with beak of basal unit short, wide, connecting duct short (Fig. 494).

♂ Not known.

Geographical distribution: Brazil, Trinidad.

Specimens examined: 6. Brazil: Santarem. Trinidad: Icacos, St. Augustine. (UMZC) (USNM).

Remarks. In color pattern, *T. unipunctata* closely resembles *Hyperaspis binotata* (Say) and similar species of the eastern United States. The type locality is Amazonian Brazil, but all other specimens examined were from Trinidad, a somewhat unusual combination of localities. However, the type specimen and the Trinidad specimens match in all characters, including identical ♀ genitalia.

2. *Tenuisvalvae peregrina* (Mulsant, 1850), **n. comb.**

Hyperaspis peregrina Mulsant, 1850: 691; CROTCH 1874: 230; KORSCHESKY 1931: 194; BLACKWELDER 1945: 448; GORDON 1987: 29.

Hyperaspis subapicalis Crotch, 1874: 229; KORSCHESKY 1931: 197; BLACKWELDER, 1945: 448; GORDON 1987: 29. (**n. syn.**).

Type locality: of *peregrina*, Brazil (UMZC, lectotype designated by GORDON 1987); of *subapicalis*, Rio de Janeiro, Brazil (UMZC, lectotype designated by GORDON 1987).

Description. ♀, length 3.0 mm, width 2.5 mm; body form round, convex. Dorsal surface with head dull, strongly alutaceous, pronotum slightly less dull than head, elytra feebly shiny. Color black except pronotum with anterolateral 1/4 yellow, inner margin of yellow area rounded; elytron with large, round, subapical yellow spot (Figs. 495, 496); antenna, mouthparts, tibiae and tarsi reddish yellow; propleuron yellow; abdomen black except outer 1/4 and sternum 6 reddish yellow. Head punctures fine, nearly hidden in alutaceous sculpture, separated by less than to 3 times a diameter. Pronotal punctures larger than on head, separated by a diameter or less; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on elytron, dense medially, nearly contiguous laterally. Punctures on

abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc strongly alutaceous, finely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, not internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 497). Prosternum with intercoxal carinae tapered toward base, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate. Genitalia with beak of basal unit short, wide; connecting duct short (Fig. 498).

♂. Similar to ♀ except head yellow; pronotum with lateral 1/4 yellow. ♂ genitalia with basal lobe 5/8 length of paramere, apex narrowly, obliquely rounded, with large, rounded projection on one side; paramere wide, tapered to rounded apex in apical 1/2; siphon long, slender, sinuate in apical 1/4, apex with membranous area, basal capsule with inner arm long, slender, outer arm slender, shorter than inner arm, base emarginate.

Variation. None observed.

Geographical distribution: Brazil.

Specimens examined: 3. Brazil. Rio de Janeiro; Rio de Janeiro, Campo Grande. (USNM).

Remarks. *Tenuisvalvae peregrina* is characterized by a single, yellow, subapical spot on each elytron. CROTCH himself (1874) remarked on the similarity between *H. peregrina* and *subapicalis*. After comparing type specimens, we conclude that they represent both sexes of the same species.

The BM collection has two syntypes of *H. subapicalis* that we designate as paralectotypes. The first syntype is labeled "TYPE/ Fry Rio Jano/ *subapicalis*/ Fry Coll. 1905.100./ Type (orange bordered circle)/ *Hyperaspis subapicalis* Crotch Type Brazilia/ Syntype *Hyperaspis subapicalis* Cr. det. R.G. Booth 2004." The second syntype is labeled "TYPE/ Fry Rio Jano/ Fry Coll. 1905.100./ SYNTYPE (blue bordered circle)/ Syntype *Hyperaspis subapicalis* Cr. det. R.G. Booth 2004".

3. *Tenuisvalvae deyrollei* (Crotch, 1874), **n. comb.**

Hyperaspis deyrollei Crotch, 1874: 229; KORSCHESKY 1931: 187; BLACKWELDER 1945: 446; GORDON 1987: 29.

Type locality: Teapa, S. Paulo (São Paulo) (Brazil) (UMZC, lectotype designated by GORDON 1987).

Description. ♂, length 2.5 mm, width 1.9 mm; body form round, convex. Dorsal surface with head dull, strongly alutaceous, pronotum slightly less dull than head, elytra shiny. Color black except head entirely yellow; pronotum mostly reddish yellow with black basomedian macula, lateral margins of macula medially emarginated by pale area; elytron with 2 large, reddish yellow spots, spot on disc raggedly rounded, apical spot transverse (Fig. 499, 500); antenna, mouthparts, legs yellow; propleuron yellow; abdomen reddish yellow except median 1/2 of sterna 1-3 dark brown. Head punctures fine, nearly hidden in alutaceous sculpture, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures much larger than on elytron, sparse medially, dense laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc slightly shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique deeply grooved internally, descending externally femoral excavations deep. Antenna with 11 articles (Fig. 501). Prosternum with intercoxal carinae convergent, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum broadly, feebly emarginate. Genitalia with basal lobe 3/4 length of paramere, with large projection on one side, paramere wide, feebly tapered to rounded apex (Fig. 502); siphon slender, apex curved upward with internal membranous area, basal capsule with inner arm broad, short, outer arm short (Figs. 503, 504).

♀ Similar to ♂ except head black; pronotum with median black area extended nearly to apex. Genitalia with beak of basal unit short; connecting duct long (Fig. 505).

Variation. Length 2.3 to 2.7 mm, width 1.8 to 2.1 mm. Median dark area on pronotum varies slightly in size; color of dorsal maculation varies from very dark reddish yellow to yellow and the lectotype has a red discal spot.

Geographical distribution: Southeastern South America.

Specimens examined: 110. Argentina: Bella Vista; Buenos Aires; Burzaco Sur; Corrientes; Delta; Entre Rios; Haedo; Loreto; Misio-
nes; Rio Chama; Corrientes, Santo Tomé; Salto; Tigre. Uruguay: Montevideo (CCM) (MBR) USNM).

R e m a r k s . *Tenuisvalvae deyrollei* is frequently collected in Argentina where it is often found in collections under the name "*Hyperaspis muhni* Brèthes". This is apparently a manuscript name, as no published record of it can be located. The 2 elytral spots and mostly reddish yellow pronotum distinguish this species.

4. *Tenuisvalvae notata* (Mulsant, 1850), **n. comb.**

Cleothera notata Mulsant, 1850: 550.

Hyperaspis notata: CROTCH 1874: 227; KORSCHESKY 1931: 192; BLACKWELDER 1945: 447; GORDON 1987: 29.

Type locality: Brazil (UMZC, lectotype designated by GORDON 1987).

D e s c r i p t i o n . ♂, length 3.2 mm, width 2.6 mm; body form broadly round, convex. Dorsal surface slightly shiny, alutaceous. Color yellow except pronotum with 3 black maculae, 1 narrow, irregular basomedian macula, and 2 triangular median maculae; elytron with 4 spots and sutural margin black, 1 oval, discal spot on suture, 1 oval spot anterior to and laterad of discal spot, 1 comma shaped spot medially near lateral margin, 1 irregularly oblong spot on apical declivity, sutural margin narrowly black anterior to discal spot, and widely black posterior to discal spot; scutellum black (Fig. 506); pro-, meso-, and metasterna black; median area of basal 3 abdominal sterna dark brown. Head punctures fine, nearly hidden in alutaceous sculpture, separated by less than to 3 times a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures

fine, sparse medially, becoming much larger than on elytron, dense laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, indistinctly punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, not internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 509). Prosternum with intercoxal carinae convergent medially, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 2/3 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum broadly, feebly emarginate. Genitalia with basal lobe as long as paramere, slender, with feeble lateral projection on one side, paramere wide, feebly tapered to rounded apex (Figs. 507, 508); siphon slender, straight, apex with internal membranous area, basal capsule with inner arm slender, short, outer arm wide, longer than inner arm (Figs. 510, 511).

♀ Similar to ♂ except head with triangular black spot on each side of vertex. Genitalia with beak of basal unit short; connecting duct short (Fig. 512).

Variation. Length 3.0 to 3.4 mm, width 2.4 to 2.7 mm. Pronotal maculae vary somewhat in size; most Colombian specimens have the median spots fused with basomedian macula; elytral spots vary slightly in size, but remain quite constant in shape.

Geographical distribution: Central and northern South America.

Specimens examined: 36. Bolivia: Loma Alta. Brazil: Bahia; Rio de Janeiro, Campo Grande; Corumba; Sta. Lucia; São Paulo, Campinas. Colombia: Valle del Cauca, Pto. Tejada; Antioquia, Rio Negro (BM) (CMNH) (USNM).

Remarks. Pronota and elytra with yellow backgrounds and black maculation occur frequently in species of Hyperaspini and especially Brachiacanthini. Spot patterns are repeated in several generic taxa, creating a confusing situation. *Tenuisvalvae* has 3 species with this type of pattern, *T. parenthesis*, *T. notata*, and *T. ecoffeti*. The last-named species lacks a distinct discal spot on the elytron and the pronotum is mostly black with wide, lateral yellow areas. *Tenuisvalvae parenthesis* has a c-shaped vitta on each elytron.

5. *Tenuisvalvae bisquinquepustulata* (Fabricius, 1801), **n. comb.**

Coccinella bisquinquepustulata Fabricius, 1801: 384.

Cleothera bisquinquepustulata: MULSANT 1850: 610.

Hyperaspis bisquinquepustulata: CROTCH 1874: 221; KORSCHESKY 1931: 185; BLACKWELDER 1945: 446.

Cleothera raynevalii Mulsant, 1853: 85. (**n. syn.**).

Hyperaspis raynevalii: CROTCH 1874; KORSCHESKY 1931: 195; BLACKWELDER 1945: 448; GORDON 1987: 29.

Hyperaspis (Tenuisvalvae) raynevalii: DUVERGER 1989: 148.

Hyperaspis longicoxitis Nutting, 1980: 260. (**n. syn.**).

Hyperaspis (Tenuisvalvae) raynevalii longicoxitis: DUVERGER 1989: 152.

Type locality: of *bisquinquepustulata*, "in America meridionali" (ZMUC, lectotype here designated); of *raynevalii*, Cayenne (French Guiana) (UMZC, lectotype designated by GORDON 1987); of *longicoxitis*, California, San Diego Co., Jacumba (CAS, holotype).

Description. ♂, length 3.2 mm, width 2.6 mm; body form broadly round, convex. Dorsal surface with head dull, strongly alutaceous, pronotum and elytra shiny. Color black except head entirely yellow; pronotum mostly yellow with large, black, basomedian spot, spot not extended to anterior pronotal margin, anterior margin of spot slightly emarginate; elytron with 5 yellow spots, spot laterad of scutellum and discal spot round, humeral spot apically tapered, spot at middle of lateral margin elongate, apical spot transverse (Fig. 513, 514); antenna, mouthparts, legs reddish yellow; propleuron and epipleuron yellow; abdomen reddish yellow except median 2/3 of sterna 1-5 dark brown. Head punctures distinct, visible in alutaceous sculpture, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures fine, sparse medially, becoming much larger, dense laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc slightly shiny, punctures coarse, separated by a diameter. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 516). Prosternum with intercoxal carinae convergent, basally stemmed, reaching basal margin. Postcoxal line

on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum broadly, feebly emarginate. Genitalia with basal lobe 3/4 length of paramere, apex rounded, with large projection on one side, paramere wide, feebly tapered to rounded apex (Fig. 517); siphon slender, apex sinuate with internal membranous area, basal capsule with inner arm slender, elongate, outer arm wide, elongate (Figs. 518, 519).

♀ Similar to male except pronotum with median black area extended to apex. Genitalia with beak of basal unit short; connecting duct short (Figs. 520, 521).

Variation. Length 2.7 to 3.2 mm, width 2.3 to 2.6 mm. In the typical form described above the ground color is black, the size of the pronotal dark area varies slightly; the scutellar and discal spots are often narrowly connected, and the 3 lateral spots may be narrowly or broadly connected. The *T. longicoxitis* form has the ground color brown, median pronotal spot brown, reduced in size, and often M-shaped (Fig. 515).

Geographical distribution: Central and northern South America, some Caribbean islands, and Central America. Introduced to Africa.

Specimens examined: 37. Brazil: Mato Grosso, Chapada; Pará: Belem, Cachimbo; Santarem; Sta. Lucia; Pará, Curraliño. Ecuador. Napo, Pompeya. Guyana. Hope. Peru: Tingo Maria. Surinam. (No locality). Trinidad: St. Augustine; Tunapuna. Bolivia: Guanay. (BM) (CCM) (CDA) (CMP) (CNC) (CMNH) (MSNG) (USNM) (ZMHB).

Remarks. This is a widespread, frequently collected species that has been the object of biological control research under the name *H. raynevalii*. As a result, it was introduced into the United States (southern California) and to central Africa (Brazzaville, Congo Republic).

The type specimen of *Coccinella bisquinquepustulata* F. proved to be synonymous with the type of *T. raynevalii*; thus, the latter name is a junior synonym of the former.

DUVERGER (1989) placed *Hyperaspis longicoxitis* in his subgenus *Tenuisvalvae* and, at the same time, reduced the status of *T. longicoxitis* to subspecies. He also described a new subspecies, *T. raynevalii brazzavillensis*, for specimens from Brazzaville.

We consider *T. longicoxitis* a synonym of *T. bisquinquepustulata* because the only distinguishing characters are in coloration. The former name was applied to specimens from Trinidad and certain Caribbean islands that have a brown dorsal ground color instead of black, and the basomedian pronotal spot reduced and often M-shaped. We have seen examples from Pará, Brasil, that are essentially identical in color to Caribbean specimens, thus making color differences useless as distinguishing characters.

Two syntypes of *Coccinella bisquinquepustulata* in the ZMUC were examined. The lectotype, designated here to stabilize future usage of the name, is labeled "Type (red label)/ *C. bisquinquepustulata*, Autata, ex. Am. mer. Schonh." (handwritten). The paralectotype designated here is labeled "Type" (red label).

6. *Tenuisvalvae ecoffeti* (Mulsant, 1853), **n. comb.**

Hyperaspis ecoffeti Mulsant, 1853: 99; CROTCH 1874: 226; KORSCHESKY 1931: 187; BLACKWELDER 1945: 447; GORDON 1987: 28.

Hyperaspis quadrina Mulsant, 1853: 100; KORSCHESKY 1931: 187 (as a synonym of *H. ecoffeti*).

Type locality: of *ecoffeti*, Brazil (UMZC, lectotype designated by GORDON 1987); of *quadrina*, Sainte (sic !) Catherine, Brazil (BM, lectotype here designated).

Description. ♂, length 2.7 mm, width 2.0 mm; body form oval, convex. Head alutaceous, dull; pronotum slightly alutaceous, shiny; elytra polished, shiny. Color yellow except pronotum black with lateral and anterior borders yellow; elytron with 2 spots and sutural margin black, 1 irregularly rectangular spot medially in apical 1/2, 1 irregularly round spot medially in posterior 1/2, sutural margin with broad, black vitta extended from just posterior to scutellum nearly to apex, vitta slightly widened in apical 1/4, narrowed nearly to apex then curved outward, lateral and apical margins of elytron narrowly black; scutellum black (Fig. 522); pro-, meso-, and metasterna black; median area of basal 4 abdominal sterna dark brown. Head punctures fine, distinct, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by less than to 3 times a diam-

eter. Metasternal punctures coarse, larger than on elytron, separated by a diameter medially, becoming contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, densely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 524). Prosternum with intercoxal carinae convergent, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/2 distance to basal sternal margin. Fifth sternum with apex broadly, deeply emarginate; 6th sternum broadly, feebly emarginate. Genitalia with basal lobe more than 3/4 length of paramere, wide, with strong lateral projection on one side, paramere wide, feebly tapered to rounded apex (Fig. 525); siphon slender, apex slightly bent downward, with membranous area, basal capsule with inner arm slender, short, outer arm wide, longer than inner arm (Figs. 526, 527).

♀ Similar to ♂ except head black with median reddish yellow, apically triangular area. Genitalia with beak of basal unit long; connecting duct long (Fig. 528).

Variation. Length 2.6 to 2.7 mm, width 2.2 to 2.3 mm. Pronotal macula varies significantly from occupying median 1/2 of pronotum to occupying most of pronotum with only narrow lateral and anterior margins yellow; elytral spots vary slightly in size, sutural vitta varies noticeably in width and shape from the typical to straight from apex to base (*quadrina*) (Fig. 523).

Geographical distribution: Argentina, Brazil, Paraguay.

Specimens examined: 32. Argentina: Loreto, Misiones. Brazil: Nova Teutonia; São Paulo, Cantareira, Campinas; Santa Catarina, Florianópolis. Paraguay: Hohenau, Alto-Paraná (BM) (USNM) (ZMHB).

Remarks. This species resembles only *T. notata* in color pattern. It is distinguished by the single black pronotal macula, lack of discal spot on the elytron, and 2 spots on each elytron.

CROTCH (1874) correctly considered *Hyperaspis quadrina* a junior synonym of *T. ecoffeti*. The type specimen of *T. quadrina*

was from the Deyrolle collection, according to MULSANT (1853), but was not found in the UMZC. However, the Natural History Museum, London, collection has a single specimen of *T. quadrina*, labeled as a type that bears the correct locality label recorded by Mulsant. We consider that specimen, labeled "S. Cathar (green paper)/ 261/880.23/ Type (orange bordered disc/ *Hyperaspis quadrina*, M. Brasil (blue paper)," to be the lectotype of *H. quadrina* and so designate it to stabilize future usage of the name. KIRSCH (1876) described "*Hyperaspis Ecoffeti* var. *fraudulenta*," a combination repeated by KORSCHESKY (1931) and BLACKWELDER (1945). Examination of the *H. fraudulenta* type specimen (SMTD) revealed that it is actually a valid species of *Cyra* (Brachiacanthini).

7. *Tenuisvalvae parenthesis* n. sp.

Type material: Holotype ♀: Kolumb (Colombia), Cundinamarca, Monterredondo, 1961, 1400 m, leg. Schneble (USNM). Paratypes, 5. 1, same data as holotype; 1, Colombia, Boy. (Boyaca), Guayata, 18.X.40, altitude 1720 m, Murillo No 5299 (USNM). 1, Venezuela, E.do Merida, La Trampa, Lagunillas 1700 m, 10.KKK.778, leg Bordon; 2, Venezuela, Timotes, m 2200, (Edo. Merida), 23-I-1968, leg. Bordón (CCM) (MSNG) (USNM).

Description. ♀, length 3.5 mm, width 2.8 mm; body form round, convex. Dorsal surface shiny except head dull, strongly alutaceous, pronotum shiny, slightly alutaceous. Color yellow except head with borders black, black border on vertex medially emarginated with yellow; pronotum with basal border narrowly black, 2 curved projections extended from basal border to apex; elytron with short, apically knobbed vitta extended from base past humeral callus, suture narrowly black with parenthesis shaped, apically knobbed vitta extended out at middle, curved posteriorly onto apical declivity, small, triangular spot near lateral margin in posterior 1/2 (Figs. 529, 530); mouthparts dark brown; venter of head, pro-, meso-, metasterna, femora (except apices), and median area of abdominal sterna 1-5 black. Head punctures fine, nearly hidden in alutaceous sculpture, separated by 1 to 2 times a diameter. Pronotal punctures larger than on head, separated by less than to 2 times a diameter; Elytral punctures larger than pronotal punctures, separated by 1 to

2 times a diameter. Metasternal punctures larger than on elytron, separated by a diameter medially, dense, nearly contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Antenna with 11 articles (Fig. 531). Prosternum with intercoxal carinae tapered toward base, stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate. Genitalia with beak of basal unit short, connecting duct short (Fig. 535).

♂ Similar to ♀ except ♂ genitalia with basal lobe 5/8 length of paramere, abruptly tapered to narrow apex in apical 1/2, with large, acute projection on one side; paramere wide, tapered to rounded apex in apical 1/2 (Fig. 532); siphon long, slender, sinuate in apical 1/4, apex with membranous area, basal capsule with inner arm elongate, slender, outer arm slender, shorter than inner arm, base emarginate (Figs. 533, 534).

Variation. Length 3.2 to 3.5 mm, width 2.5 to 2.8 mm. Elytron with triangular lateral spot sometimes connected to parenthetical vitta; apex of parenthetical vitta may be narrowly separate from main stem.

Etymology. The species is named for the curved elytral vitta reminiscent of a parenthesis.

R e m a r k s . *Tenuisvalvae parenthesis* bears some resemblance to *T. caucaensis*, but the dorsal color pattern is thus far unique within the genus.

8. *Tenuisvalvae caucaensis* n. sp.

Type material: Holotype ♂: Colombia, Cauca, 15 mi. E. Silvia, 11,000', July 16, 1970, H. & A. Howden (USNM). Allotype ♀: Colombia, Cauca, 12 mi. E. Silvia, 11,000, July 15, 1970, H. & A. Howden (USNM).

Description. ♂, length 3.0 mm, width 2.6 mm; body form rounded, widest behind middle of elytra, convex. Head and pronotum slightly alutaceous, weakly shiny; elytra polished. Color black except head with apical 3/4 yellow; pronotum with lateral 1/3 yellow, yellow area with curved inner margin; elytron with 3 large, spots, discal spot elongate, sublateral spot oval with anteromedian angle truncate, subapical spot more or less round (Figs. 536, 537); antenna, propleuron yellow; tarsi reddish brown. Head punctures distinct, separated by a diameter or less. Pronotal punctures as large as head punctures, separated by 1 to 2 times a diameter; Elytral punctures larger than pronotal punctures, separated by 1 to 2 times diameter. Metasternal punctures larger than on elytra, dense, absent medially, separated by a diameter laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc slightly alutaceous, coarsely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Antenna with 11 articles (Fig. 538). Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Prosternum with intercoxal carinae tapered to base, not stemmed. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, not flattened along margin, apex recurved 2/3 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate; 6th sternum broadly, distinctly emarginate. Genitalia with basal lobe 3/4 length of paramere, abruptly narrowed apically with large lateral projection, paramere nearly parallel sided, apex broadly rounded, trabes dark brown (Fig. 539); siphon slender, apex straight with membranous area, capsule dark brown with inner arm large, long, outer arm large, wide (Figs. 540, 541).

♀ Similar to ♂ except head black. Genitalia with beak of basal unit large, wide, connecting duct short (Fig. 542).

Variation. None observed.

Etymology. The species is named for the Department of Cauca where the type specimens were collected.

Remarks. This species is differentiated from other *Tenuisvalvae* species by the 3 very large, yellow elytral spots, and broad, posteriorly widened body. The dark brown genital trabes and siphonal capsule are also worth noting because these structures are nearly always yellow or at least pale in hyperaspine taxa.

9. *Tenuisvalvae bromelicola* (Sicard, 1925), **n. comb.**

Cleothera bromelicola Sicard, 1925: 81.

Hyperaspis bromelicola: KORSCHESKY 1931: 185; BLACKWELDER 1945: 446.

Hyperaspis (Tenuisvalvae) bromelicola: PECK 2005: 202.

Type locality: Panama, Canal Zone (BM, lectotype here designated).

Description. ♂, length 2.7 mm, width 2.3 mm; body form round, convex. Dorsal surface with head dull, strongly alutaceous, pronotum shiny slightly alutaceous, elytra shiny. Color black except head entirely yellow; pronotum mostly yellow with black basomedian macula, anterior margin of macula with 2 lateral projections; elytron with 3 yellow spots, spot on base laterad of scutellum triangular, basal humeral spot somewhat triangular, apical spot long, curved along outer elytral margin from near suture to midpoint of elytron (Figs. 543, 544); antenna, mouthparts, propleuron, legs yellow; abdomen reddish yellow except median 1/2 of sterna 1-3 dark brown. Head punctures fine, nearly hidden in alutaceous sculpture, separated by less than to twice a diameter. Pronotal punctures larger than on head, separated by less than to twice a diameter; elytral punctures larger than pronotal punctures, separated by 1 to 2 times a diameter. Metasternal punctures much larger than on elytron, sparse medially, dense laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside postcoxal arc shiny, finely, sparsely punctured. Clypeal apex deeply emarginate, clypeus and frons joined at abrupt angle. Antenna with 11 articles (Fig. 545). Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Prosternum with intercoxal carinae convergent, basally stemmed, reaching basal margin. Postcoxal line on 1st abdominal sternum extended to posterior sternal margin, flattened along margin, apex recurved 1/3 distance to basal sternal margin. Fifth sternum with apex broadly, feebly emarginate; 6th sternum broadly, feebly emarginate. Genitalia with basal lobe slightly shorter than paramere, with barely perceptible projection on one side, paramere wide, feebly tapered to rounded apex (Fig. 547); siphon slender, apex curved, sinuate with membranous area, basal capsule with inner arm broad, short, outer arm broad, short (Figs. 548, 549).

♀ Similar to ♂ except head with vertex black on each side; pronotum with median black area extended to apex, apex of black area medially emarginated with clear, V-shaped area exposing median yellow area of head vertex. Genitalia with beak of basal unit short, large; connecting duct short (Figs. 550, 551).

Variation. Length 2.6 to 3.1 mm, width 2.2 to 2.6 mm. Elytral maculation may have the humeral spot reduced to a small, reddish brown area, the apical spot may be expanded to cover entire apical declivity, or elongated along elytral margin nearly to humeral spot.

Geographical distribution: Colombia, Ecuador, Panama.

Specimens examined: 26. Colombia: Chocó, Istmina. Ecuador: El Oro, Machala; Santo Domingo de los Colorados. Galapagos Islands, San Cristobal. Panama: Canal Zone, Ancon. (BM) (CCM) (USNM).

Remarks. *Tenuisvalvae bromelicola* is the only known species of the genus found in both South and Central America. The distinctive color pattern should not be confused with that of any currently known species of *Tenuisvalvae*. The Natural History Museum, London, has three type specimens of this species, the first of which is designated as the lectotype to stabilize future usage of this name. It is labeled "Type (orange bordered disc)/ Panama Canal Zone VII-1914/ Pres. by Imp. Bur. Ent. Brit. Mus. 1924-482/ Larvae are predaceous on *Pseudococcus bromeliae*/ D.T. Fullaway Collector/ *Cleothera bromelicola* Sic., type n. sp. (handwritten in purple ink)". The other two syntypes, designated as paralectotypes, are labeled as is the lectotype, except one is without a circular disc with a type or syntype designation, and the other has a blue bordered disc labeled "Syntype".

10. *Tenuisvalvae gnoma* n. sp.

Type material: Holotype ♀: Col. (Colombia), S.A., Apr. 22-35, From H. Daniel, Chapin 42-31 (USNM).

Description. ♀, length 3.0 mm, width 2.3 mm; body form rounded, convex. Dorsal surface shiny with head alutaceous, feebly shiny; pronotum alutaceous, feebly shiny, elytron shiny. Color black except head with u-shaped yellow spot; pronotum with lateral 1/3 yellow; elytron pale red, narrowly bordered with black

except sutural margin, basal border narrowly extended onto humeral callus, apical border broad (Fig. 552); mouthparts dark brown; antenna, protibia yellow; epipleuron red; abdomen with lateral 1/4 yellow. Head punctures fine, separated by a diameter or less. Pronotal punctures larger than on head, separated by a diameter or less; Elytral punctures larger than pronotal punctures, separated by less than to twice a diameter. Metasternal punctures larger than on elytron, separated by less than to 3 times a diameter medially, dense, contiguous laterally. Punctures on abdominal sterna 1-4 coarse, sparse medially, becoming dense, very fine laterally; sterna 5-6 finely densely punctured throughout; area on 1st abdominal sternum inside post-coxal arc shiny, coarsely, sparsely punctured. Clypeal apex emarginate, clypeus and frons joined at abrupt angle. Epipleuron oblique, internally grooved, descending externally, femoral excavations deep. Prosternum with intercoxal carinae widely separated apically, gradually tapered toward base, reaching basal margin, not stemmed. Post-coxal line on 1st abdominal sternum extended to posterior sternal margin, slightly flattened along margin, apex recurved 3/8 distance to basal sternal margin. Fifth sternum with apex broadly, distinctly emarginate. Genitalia with beak of basal unit short, connecting duct short (Fig. 553).

♂ Not known.

Etymology. The species name is the Latin *gnoma*, meaning dwarf, referring to the small size.

Remarks. *Tenuisvalvae gnoma* is the only known species of *Tenuisvalvae* with mostly red elytra.

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REFERENCES

- ALMEIDA L. M. & VITORINO M. D., 1997 - A new species of *Hyperaspis* Redtenbacher (Coleoptera: Coccinellidae) and notes about the life habits - *Col. Bull.*, Gainesville, 51: 213-216.
- BLACKWELDER R. E., 1945 - Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies and South America. Part 3 - *Bull. U.S. Nat. Mus.*, Washington, 185: 343-550.
- BOHEMAN C. H., 1859 - Coleoptera. Species novas descripsit (pp. 113-218) - In: Kongliga Svenska Fregatten Eugenies Resa omkring Jorden. Zoologi, I, Insecta, Stockholm.
- BRÈTHES J., 1923 - Catalogue synonymique des Coccinellides du Chili - *Rev. chil. Hist. nat.*, Valparaiso, 25: 453-456.
- BRÈTHES J., 1925a - Coccinellides du British Museum (avec une nouvelle famille de Coléoptères) - *Ann. Mus. nac. Hist. nat. "B. Rivadavia"*, Buenos Aires, 33: 195-214.
- BRÈTHES J., 1925b - Coccinellides du British Museum - *Nunquam Otiosus*, Buenos Aires, 4: 1-10.
- CASEY T. L., 1908 - Notes on the Coccinellidae - *Can. Ent.*, Ottawa, 40: 393-421.
- CHAPIN E. A., 1966 - A new species of myrmecophilous Coccinellidae, with notes on other Hyperaspini (Coleoptera) - *Psyche*, Cambridge, 73: 278-283.

- CHAPUIS M. F., 1876 - Famille LXXII, Coccinellides (pp. 149-259). In: Lacordaire T. & Chapuis F., Histoire Naturelle des Insectes. Genera des Coléoptères. Tome douzième, Famille des Erotiliens, des Endomychides et des Coccinellides - Paris, Librairie Encyclopédique Roret.
- CHEVROLAT L. A., 1835 - Coléoptères du Mexique - Fasc. 4. Strasbourg, 70 pp.
- COSTA A., 1849 - Fauna del Regno di Napoli, Coleotteri, Coccinellidae - Napoli, 1: 1-112.
- CROTCH G. R., 1874 - A revision of the Coleopterous family Coccinellidae - London, 311 pp.
- DOBZHANSKY T., 1941 - Beetles of the genus *Hyperaspis* inhabiting the United States - *Smiths. Miscell. Coll.*, Washington, 101: 1-94.
- DUVERGER C., 1989 - Contribution à l'étude des Hyperaspinae. 1ère note (Coleoptera, Coccinellidae) - *Bull. Soc. linn. Bordeaux*, 17: 143-157.
- DUVERGER C., 2001 - Contribution à la connaissance des Hyperaspidinae (2ème note) - *Bull. Soc. linn. Bordeaux*, 29: 221-228.
- DUVERGER C., 2003 - Phylogénie des Coccinellidae - *Bull. Soc. linn. Bordeaux*, 31: 57-76.
- EL-ALI A. A., 1972 - A biosystematic study of Hyperaspini of California with emphasis on the immature stages - Ph.D. dissertation, University of California, Berkeley, 353 pp.
- FABRICIUS J. C., 1801 - Systema Eleutheratorum - Kiliae, 1: 1-506.
- GERMAIN P., 1854 - Descripcion de 21 especies nuevas de Coleópteros de Chile - *An. Univ. Chile*, Santiago, 11: 326-336.
- GORDON R. D., 1985 - The Coccinellidae (Coleoptera) of America North of Mexico - *J. New York Ent. Soc.*, 93: 1-912.
- GORDON R. D., 1987 - A catalogue of the Crotch collection of Coccinellidae (Coleoptera) - *Br. Mus. (N. H.), Occ. Pap. syst. ent.* London, 3: 1-46.
- GORDON R. D., 1999 - South American Coccinellidae (Coleoptera). Part VI: a systematic revision of the South American Diomini, new tribe (Scymninae) - *Annales zool.*, Warszawa, 49 (suppl. 1): 1-219.
- GORHAM H. S., 1895 - Biologia Centrali Americana, Insecta, Coleoptera, Erotylidae, Endomychidae and Coccinellidae - London, 7: I-XII, 1-275, 13 tabb.
- JACOBSON G. G., 1916 - Zhuki Rossii i Zapadnoi Evropy (Beetles of Russia and West Europe) - Petrograd, No. 11: 865-1024.
- KIRSCH T. F. W., 1876 - Beiträge zur Kenntnis der Peruanischen Käferfauna auf Dr. Abendroth's Sammlungen basirt - *Deutsche ent. Zeitschr.*, Berlin, 20: 81-133.
- KIRSCH T. F. W., 1883 - Neue südamerikanische Käfer - *Berl. ent. Zeitschr.*, Berlin, 27: 187-213.
- KORSCHESKY R., 1931 - Coccinellidae I - In: W. Junk (ed.), Coleopterorum Catalogus, Berlin. Part 118, p. 1-224
- KORSCHESKY R., 1932 - Coccinellidae II - In: W. Junk (ed.), Coleopterorum Catalogus, Berlin. Part 120, p. 225-659
- LATREILLE P. A., 1802 - Histoire naturelle, générale et particulière des Crustacés et des Insectes, Vol. 3, Paris, 467 pp.
- MADER L., 1957 - Neue Südamerikanische Coccinelliden - *Revta. chil. Ent.*, Santiago, 5: 73-94.

- NUTTING W. H., 1980 - New California *Hyperaspis* (Coleoptera: Coccinellidae) - *Pan-Pacific Ent.*, San Francisco, 56: 260-264.
- MILLÉO J. & M. ALMEIDA L., 2000 - Revisão do genero *Corystes* Mulsant (Coleoptera, Coccinellidae, Hyperaspinae, Hyperaspini) - *Revta. bras. Zool.*, São Paulo, 17: 65-74.
- MILLÉO J. & M. ALMEIDA L., 2003 - Revision of the Genus *Tiphysa* Mulsant (Coleoptera, Coccinellidae, Hyperaspinae) - *Col. Bull.*, Gainesville, 57: 274-280.
- MILLÉO J., M. ALMEIDA L. & GORDON R. D., 2004 - South American Coccinellidae (Coleoptera). Part X: a systematic revision of *Thalassa* Mulsant (Hyperaspidiinae) - *Revta. bras. Zool.*, São Paulo, 48: 395-400.
- MULSANT M. E., 1850 - Species de Coléoptères trimères sécuripalpes - *Annls. Sci. phys. nat.*, Lyon, 2: 1-1104.
- MULSANT M. E., 1853 - Supplément a la monographie des Coléoptères trimères sécuripalpes - *Opusc. Ent.*, Paris, 3: 1-178.
- MULSANT M. E., 1870 - Description de quelques Coccinellides nouvelles - *Annls. Soc. linn. Lyon*, 18: 321-327.
- ORIVEL J., SERVIGNE P., CERDAN P., DEJEAN A. & CORBARA B., 2004 - The ladybird *Thalassa saginata*, an obligatory myrmecophile of *Dolichoderus bidens* ant colonies - *Naturwissenschaften*, Berlin, 91: 97-100.
- PECK S. G., 2005 - The beetles of the Galapagos Islands, Ecuador; evolutions, ecology, and diversity (Insecta: Coleoptera) - NRC Press, Ottawa, 314 pp.
- REDTENBACHER L., 1844 - Tentamen Dispositionis Generum et Specierum Coleopterorum Pseudotrimerorum Archiducatus Austriae - Vindobonae, 32 pp.
- SCHAEFFER C., 1905 - Some additional new genera and species of Coleoptera found within the limit of the United States - *Brookl. Mus. Bull.*, New York, 1: 141-179.
- SCHILDER F. A. & SCHILDER M., 1928 - Die Nahrung der Coccinelliden und ihre Beziehung zur Verwandtschaft der Arten - *Arb. biol. Reich. Aust. Forst.*, Berlin, 16: 213-282.
- SICARD A., 1912 - Descriptions d'espèces et variétés nouvelles de Coccinellides de la collection du Deutsches Entomologisches Museum de Berlin-Dahlem - *Arch. Naturgesch.*, Berlin-Leipzig, 78: 130-138.
- SICARD A., 1925 - Description d'une espèce nouvelle de Coccinellidae - *Ann. Mag. nat. Hist.*, London, (9), 15: 81-82.
- THUNBERG C. P., 1808 - In: Schoenherr, Synonymia Insectorum oder Versuch einer Synonymie aller bisher bekannten Insecten nach Fabricius Systema Eleutheratorum geordnet. Stockholm, Vol. I, Part 2, 424 pp.
- VANDENBERG N. J., 2002 - Coccinellidae Latreille 1807. 93 - In: American Beetles, Polyphaga: Scarabaeoidea through Curculionioidea. Arnett et al. (ed.), CRC Press, Boca Raton, London, New York, Washington D.C., 861 pp.
- WEISE J., 1885 - Chrysomeliden- und Coccinelliden-Fauna Portorico's - *Arch. Naturgesch.*, Berlin-Leipzig, 51: 144-168.
- WEISE J., 1895 - Neue Coccinelliden, sowie Bemerkungen zu bekannten Arten - *Annales Soc. ent. Belg.*, Bruxelles, 39: 120-146.
- WEISE J., 1902 - Coccinelliden aus Südamerika. III - *Deutsche ent. Zeitschr.*, Berlin, 1: 161-176.

- WEISE J., 1903 - Drei neue Coccinellen - *Deutsche ent. Zeitschr.*, Berlin, 1: 257-272.
- WEISE J., 1906 - Coccinellidae in Argentina, Chili et Brasilia e collectione domini Caroli Bruchi - *Rev. Mus. La Plata*, Buenos Aires, 11: 193-198.
- WEISE J., 1922 - Coleoptera e collectione Bruchiana - *Anales Soc. cient. arg.*, Buenos Aires, 94: 30-40.
- WEISE J., 1926 - Ueber bekannte und neue Chrysomeliden und Coccinelliden aus dem Reichsmuseum zu Stockholm - *Ark. Zool.*, Stockholm (Uppsala), 18: 1-34.
- WINGO C. V., 1952 - The Coccinellidae (Coleoptera) of the upper Mississippi basin - *Iowa St. Coll. J. Science*, Ames, 27: 15-53.

ABSTRACT

South American Hyperaspidiini include 8 genera and 97 species. Genera are *Diazonema* Mulsant, *Menoscelis* Mulsant, *Thalassa* Mulsant, *Clypeaspis*, n. gen., *Prognataspis*, n. gen., *Peruaspsis*, n. gen., *Hyperaspis* Redtenbacher, and *Temisvalvae* Duverger. The genera *Gordoni* Duverger and *Aliana* Duverger are placed as junior synonyms of *Hyperaspis*. In *Diazonema* 7 species are recognized as valid, including 3 new species: *boothi*, *murilloi*, and *eccentrica*. *Clypeaspis* is erected for *Hyperaspis trilineata* Mulsant. *Prognataspis* contains a single new species, *P. surreptiva*. *Peruaspsis* is erected for the new species *P. paprzyckii* and *P. hypocrita*. Forty-one new species of *Hyperaspis* are described: *H. abertha*, *H. aemulata*, *H. apicaspis*, *H. arida*, *H. atra*, *H. ayacucho*, *H. bisignata*, *H. brethesi*, *H. camargoi*, *H. campbelli*, *H. chapini*, *H. chocoi*, *H. circumclusa*, *H. colombiensis*, *H. cracentis*, *H. dispar*, *H. dissidens*, *H. helveola*, *H. herrerae*, *H. howdeni*, *H. imitatrix*, *H. istmina*, *H. joannae*, *H. laterimacula*, *H. latitibia*, *H. lindae*, *H. mariposa*, *H. mimica*, *H. octonotata*, *H. orthivora*, *H. prolata*, *H. pseudodonzeli*, *H. pseudopavida*, *H. rosariensis*, *H. satipoensis*, *H. siladesma*, *H. simlaensis*, *H. tayronensis*, *H. uninotata*, *H. vredenburgi*, and *H. zomula*. *Temisvalvae* is recognized as a valid genus instead of a subgenus of *Hyperaspis*, and 3 new species are described: *T. caucaensis*, *T. gnoma* and *T. parenthesis*.

The following new synonyms are stated (in each couplet the second name is the valid one): *Hyperaspis cordifera* (Weise) = *H. matronata* Mulsant, *H. incompleta* Crotch = *H. scutifera* Mulsant, *H. insignis* Crotch = *H. operaria* (Mulsant), *H. communalis* Brèthes = *H. operaria* (Mulsant), *H. graphica* Weise = *H. eupaleoides* Crotch, *H. juniapuca* Brèthes = *H. festiva* Mulsant, *H. flavolineata* Mader = *H. conclusa* Weise, *H. subapicalis* Crotch = *Temisvalvae peregrina* (Mulsant), *H. raynevalii* (Mulsant) = *Temisvalvae bisquinquepustulata* (F.), and *H. longicoxitis* Nutting = *Temisvalvae bisquinquepustulata* (F.).

New combinations from *Hyperaspis* are: *T. unipunctata* (Crotch), *T. peregrina* (Mulsant), *T. deyrollei* (Crotch), *T. notata* (Mulsant), *T. ecoffeti* (Mulsant), *T. bromelicola* (Sicard), and *T. bisquinquepustulata* (F.).

Cleothera micilla Mulsant is transferred to *Diomus* Mulsant and placed as a synonym of *Diomus pallidipennis* (Mulsant).

RIASSUNTO

Coccinellidi del Sud America (Coleoptera). Parte XI: revisione sistematica degli Hyperaspidini (Hyperaspidinae).

La Tribù Hyperaspidini comprende in Sud America 8 generi e 97 specie. I generi sono: *Diazonema* Mulsant, *Menoscelis* Mulsant, *Thalassa* Mulsant, *Clypeaspis*, n. gen., *Prognataspis*, n. gen., *Peruaspis*, n. gen., *Hyperaspis* Redtenbacher e *Tenuisvalvae* Duverger. I generi *Gordoni* Duverger e *Aliana* Duverger sono considerati nuovi sinonimi di *Hyperaspis*. In *Diazonema* sono riconosciute 7 specie valide, incluse 3 nuove specie: *boothi*, *murilloi* ed *eccentrica*. Per *Hyperaspis trilineata* Mulsant viene eretto il nuovo genere *Clypeaspis*. *Prognataspis* contiene una sola nuova specie, *P. surreptiva*. Il genere *Peruaspis* viene istituito per *P. paprzyckii* e *P. hypocrita*. Vengono descritte quarantuno nuove specie di *Hyperaspis*: *H. abertha*, *H. aemulata*, *H. apicaspis*, *H. arida*, *H. atra*, *H. ayacucho*, *H. bisignata*, *H. brethesi*, *H. camargoi*, *H. campbelli*, *H. chapini*, *H. chocoi*, *H. circumclusa*, *H. colombiensis*, *H. cracentis*, *H. dispar*, *H. dissidens*, *H. helveola*, *H. herrerae*, *H. howdeni*, *H. imitatrix*, *H. istmina*, *H. joannae*, *H. laterimacula*, *H. latitibia*, *H. lindae*, *H. mariposa*, *H. mimica*, *H. octonotata*, *H. orthivora*, *H. prolata*, *H. pseudodonzeli*, *H. pseudopavida*, *H. rosariensis*, *H. satipoensis*, *H. siladesma*, *H. simlaensis*, *H. tayronensis*, *H. uninotata*, *H. vredenburgi* e *H. zonula*. *Tenuisvalvae* viene riconosciuto come genere valido invece di sottogenere di *Hyperaspis* e vengono descritte 3 nuove specie: *T. caucaensis*, *T. gnoma* e *T. parenthesis*.

Vengono stabilite alcune nuove sinonimie (la specie valida è la seconda di ogni coppia): *Hyperaspis cordifera* (Weise) = *H. matronata* Mulsant, *H. incompleta* Crotch = *H. scutifera* Mulsant, *H. insignis* Crotch = *H. operaria* (Mulsant), *H. communalis* Brèthes = *H. operaria* (Mulsant), *H. graphica* Weise = *H. eupaleoides* Crotch, *H. juniapuca* Brèthes = *H. festiva* Mulsant, *H. flavolineata* Mader = *H. conclusa* Weise, *H. subapicalis* Crotch = *Tenuisvalvae peregrina* (Mulsant), *H. raynevalii* (Mulsant) = *Tenuisvalvae bisquinquepustulata* (F.) e *H. longicoxitis* Nutting = *Tenuisvalvae bisquinquepustulata* (F.).

Le specie trasferite da *Hyperaspis* a *Tenuisvalvae* sono: *T. unipunctata* (Crotch), *T. peregrina* (Mulsant), *T. deyrollei* (Crotch), *T. notata* (Mulsant), *T. ecoffeti* (Mulsant), *T. bromelicola* (Sicard) e *T. bisquinquepustulata* (F.).

Cleothera micilla Mulsant è trasferita in *Diomus* Mulsant e considerata sinonimo di *Diomus pallidipennis* (Mulsant).

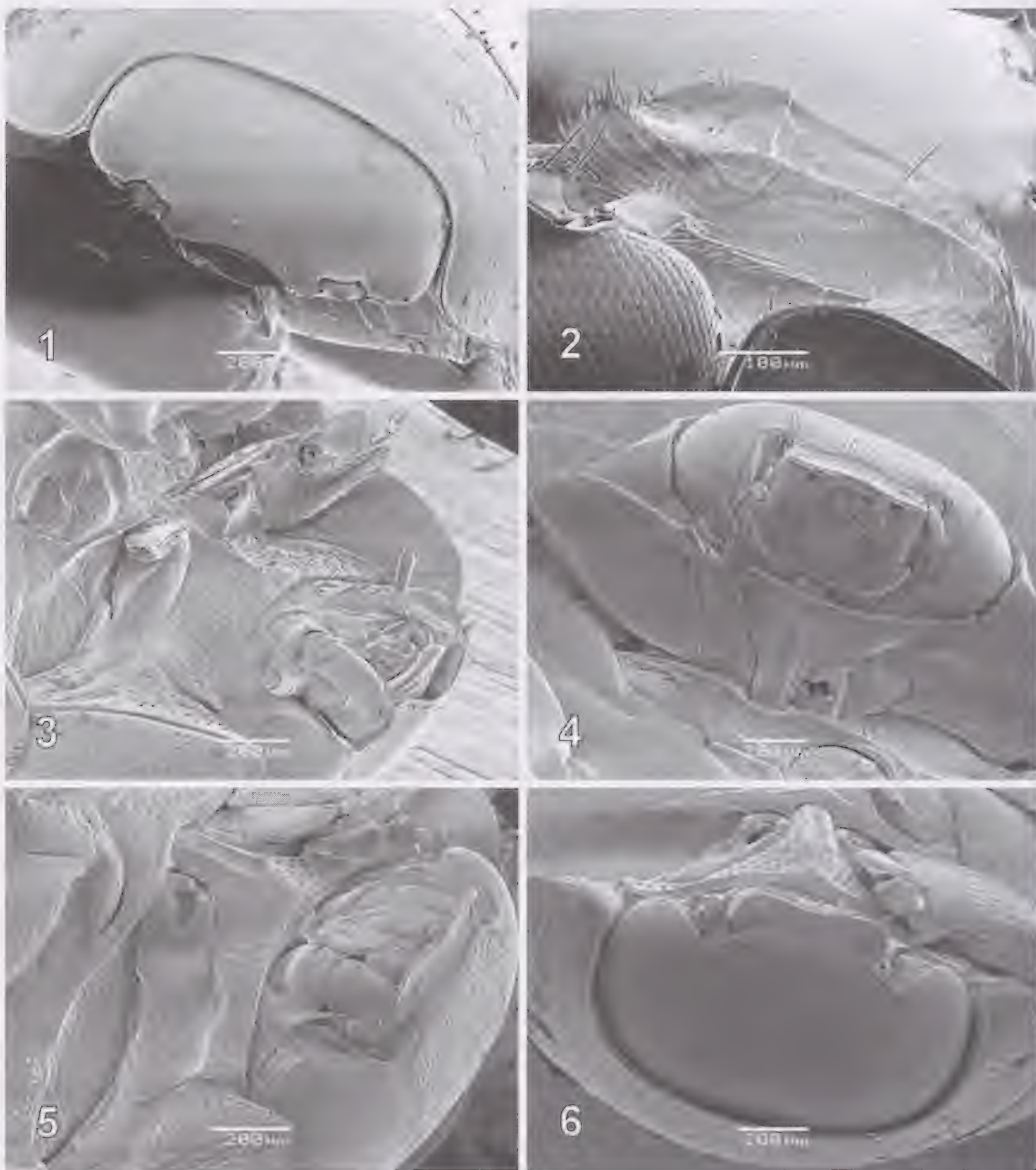
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(synonyms in *italics*)

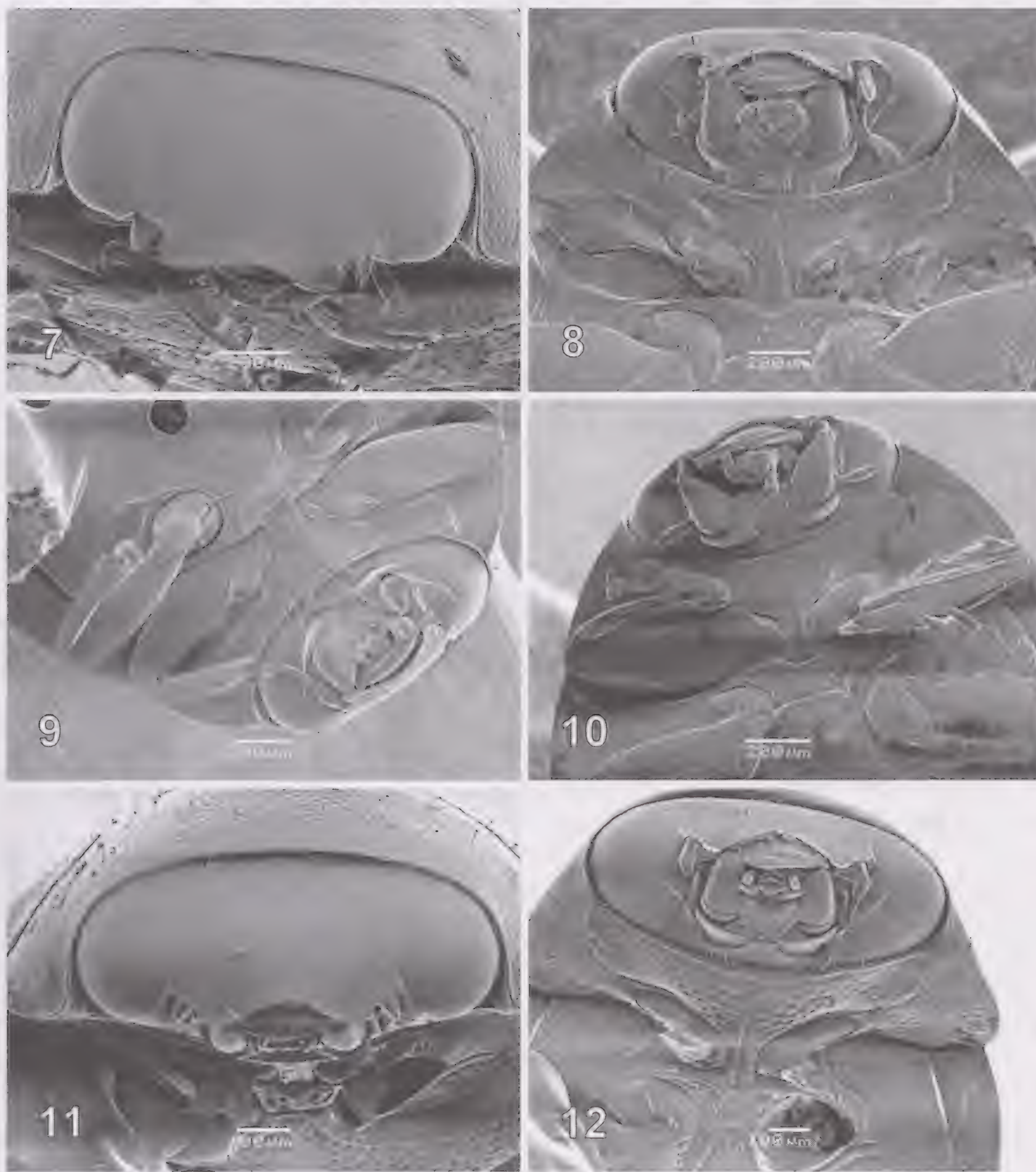
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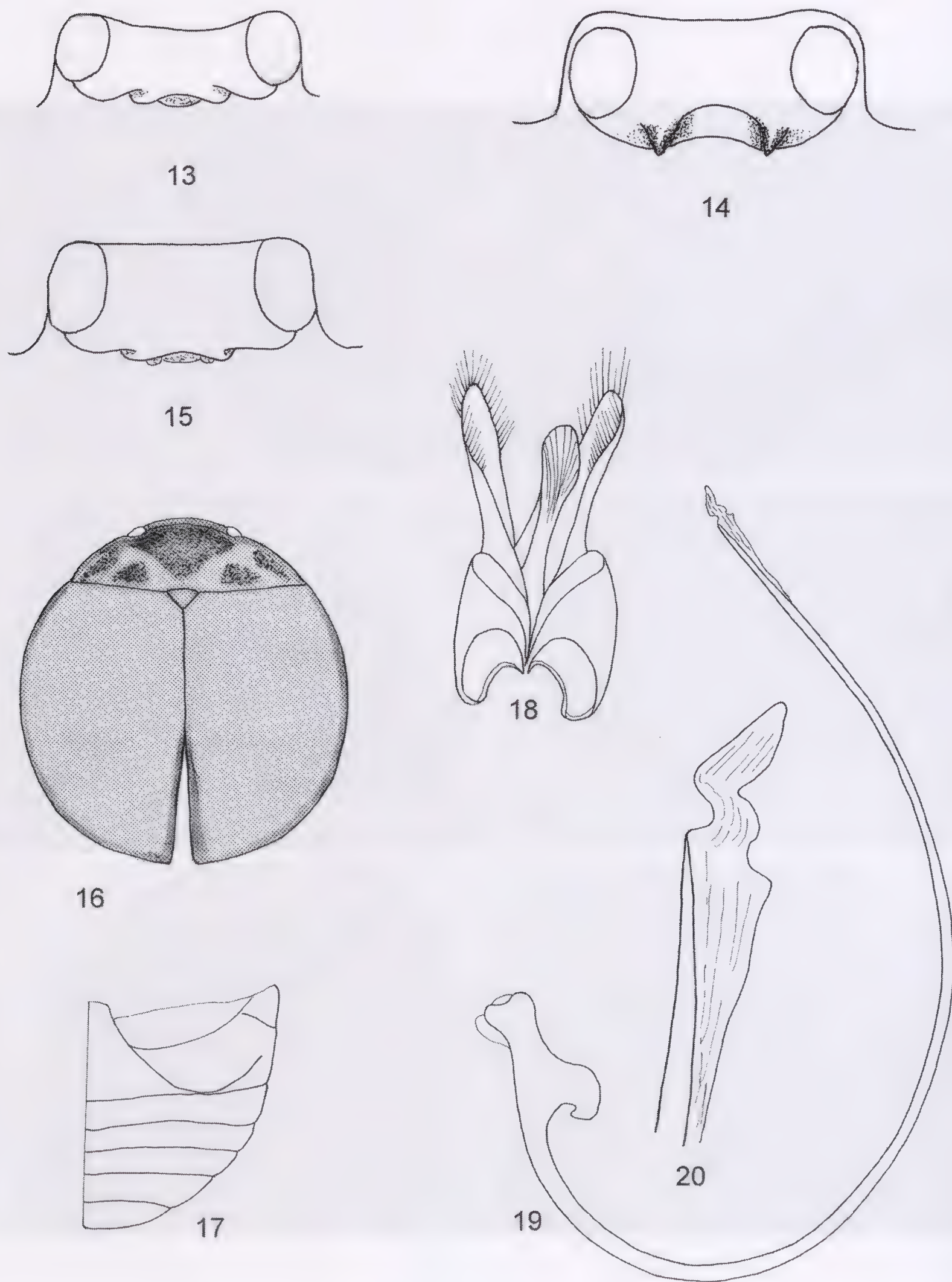
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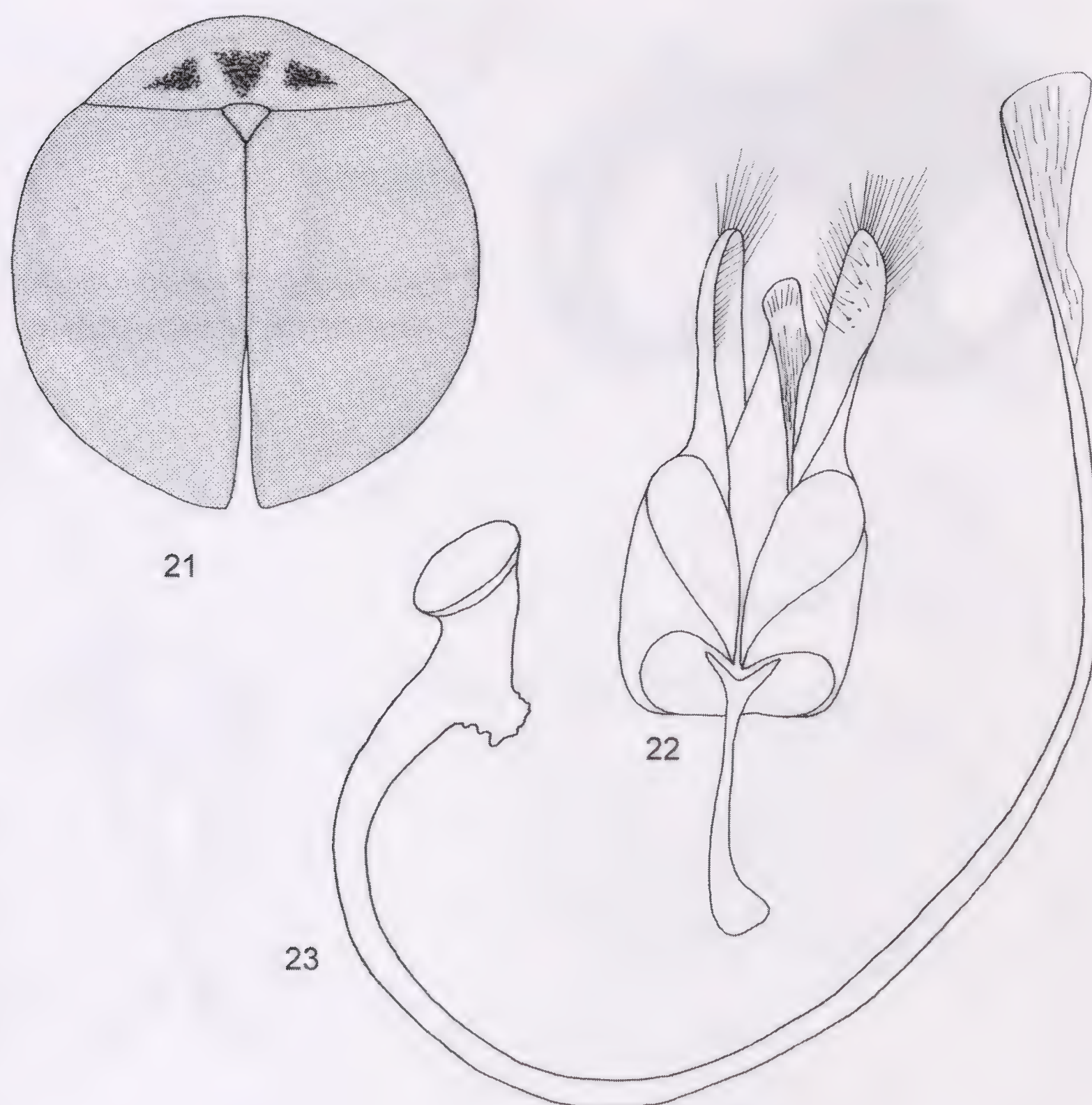
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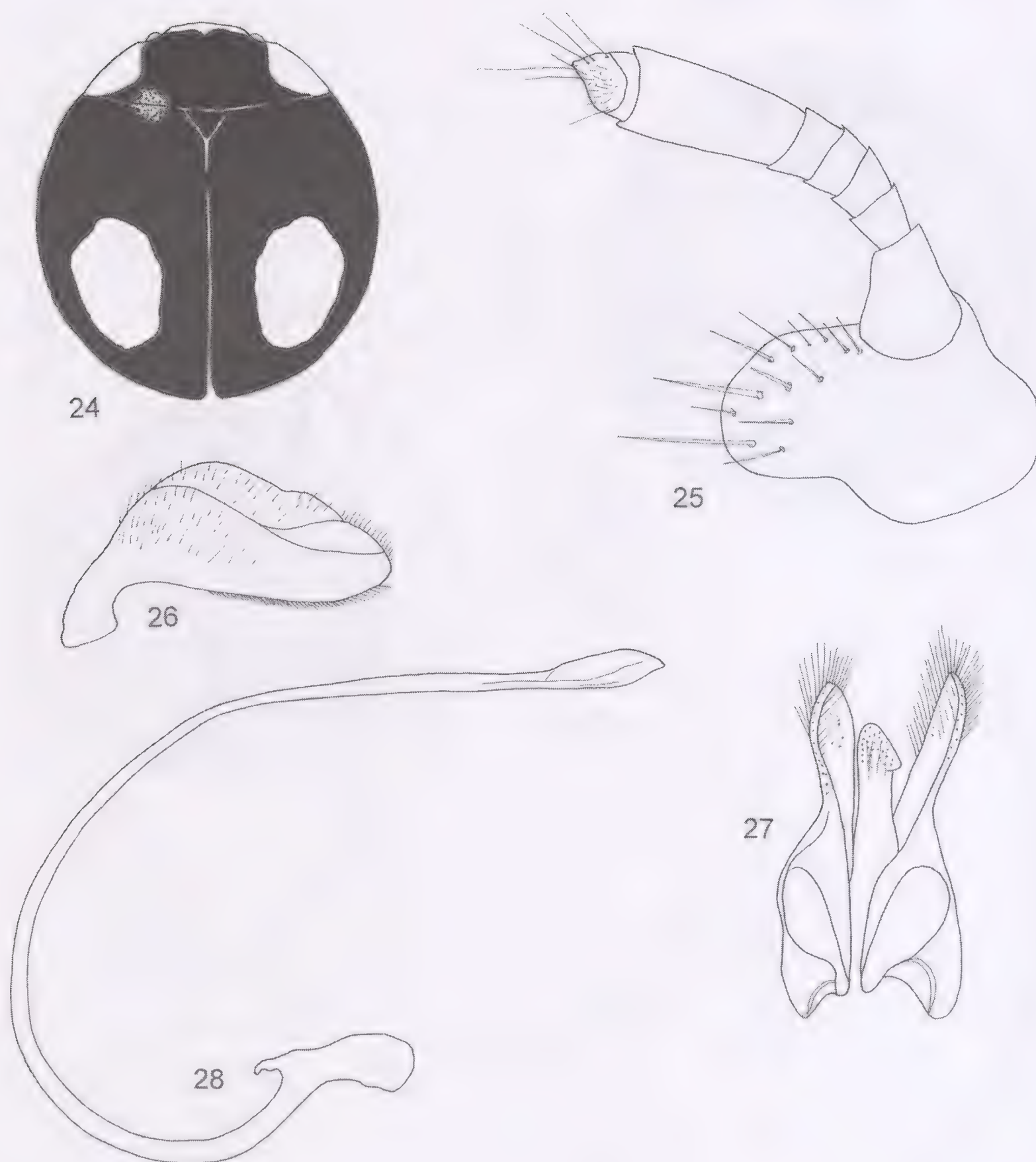
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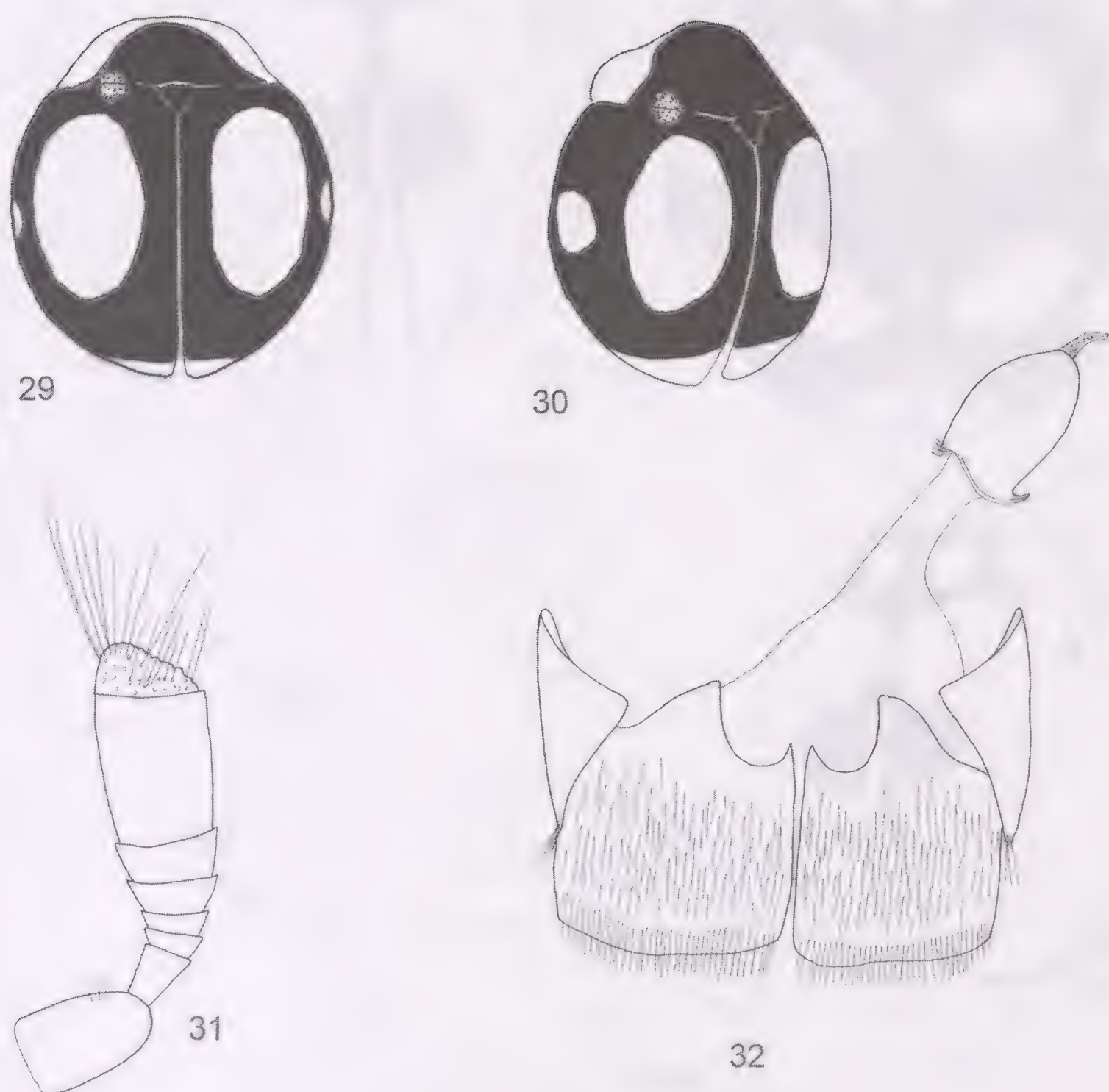
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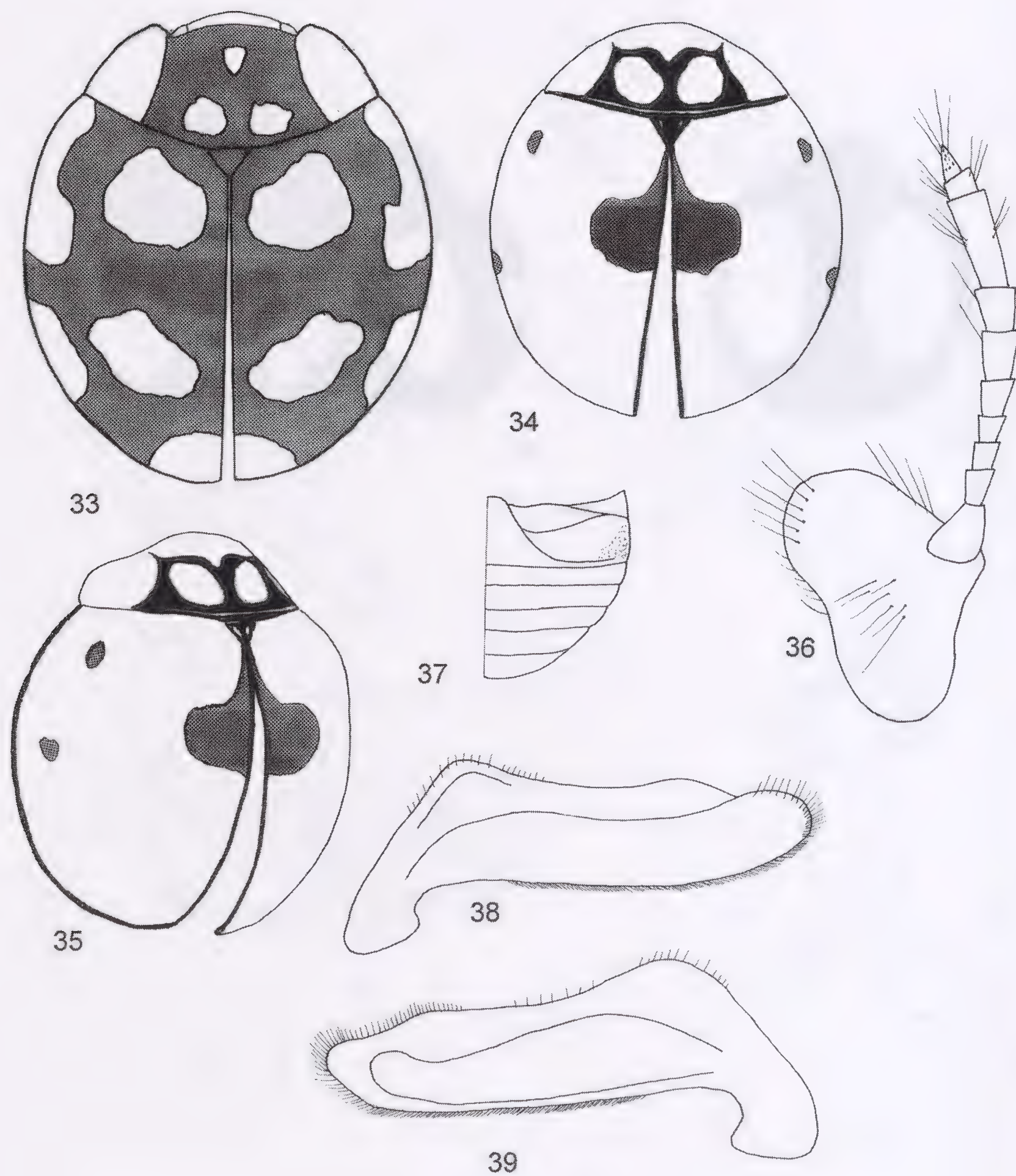
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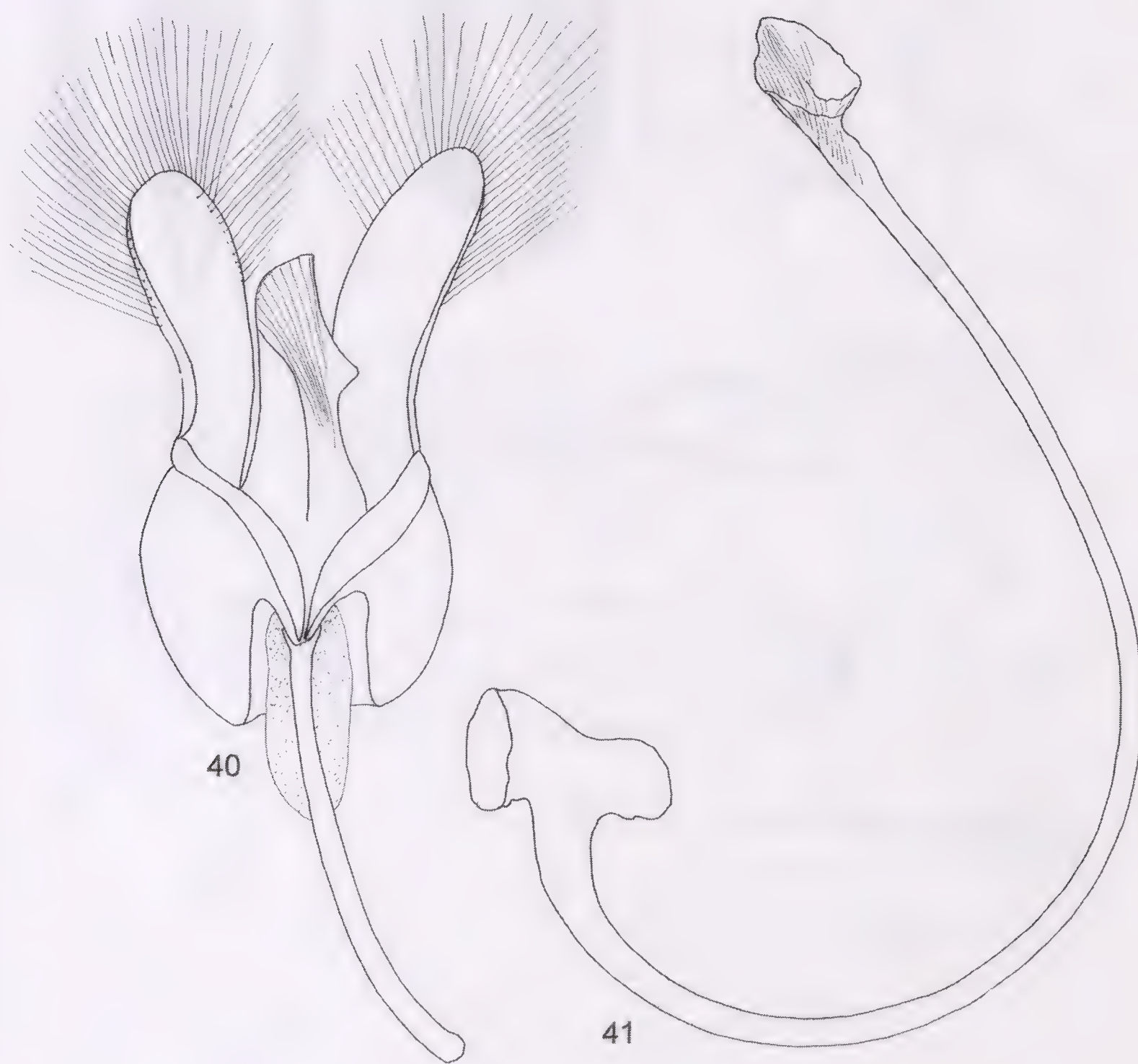
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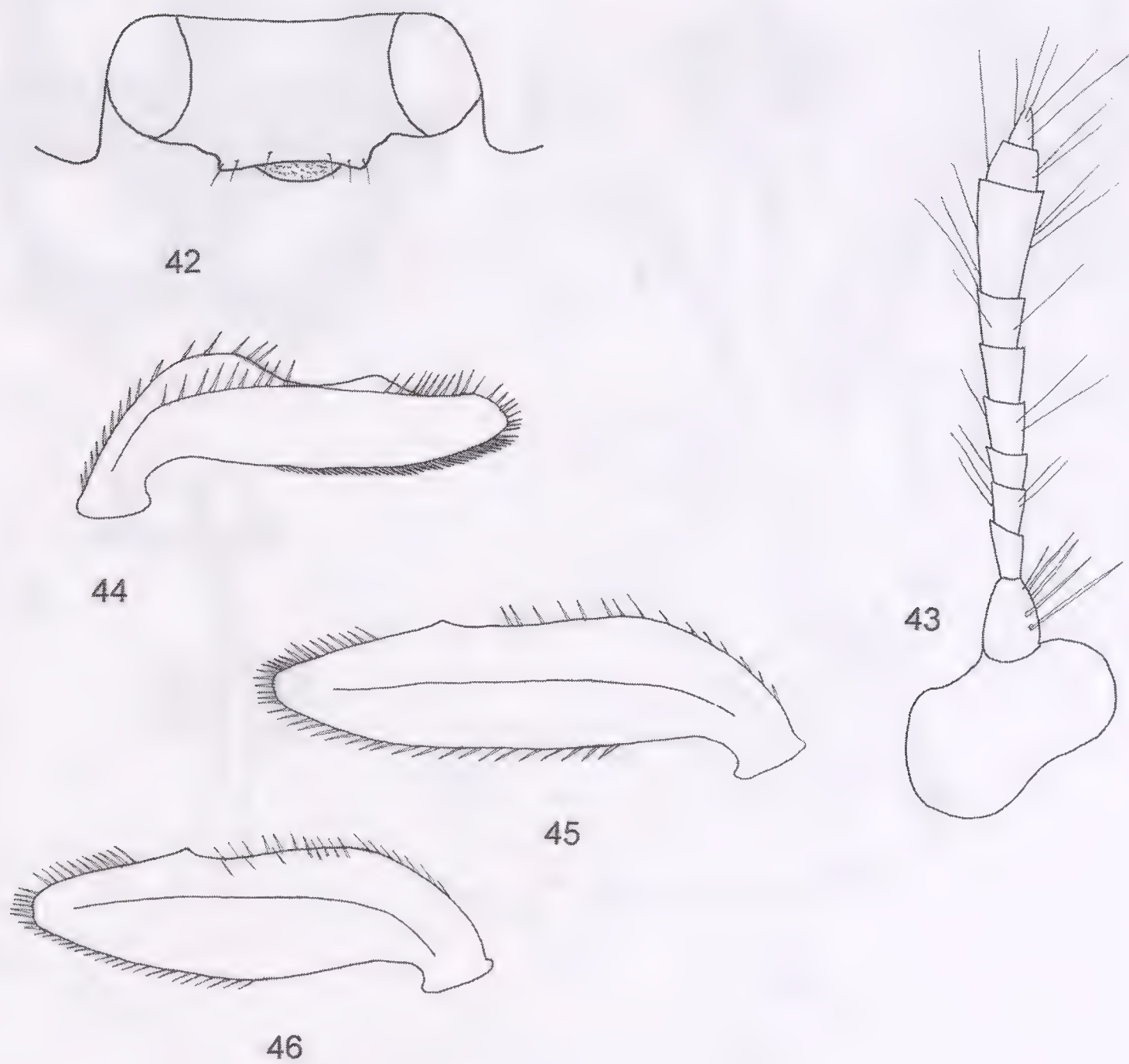
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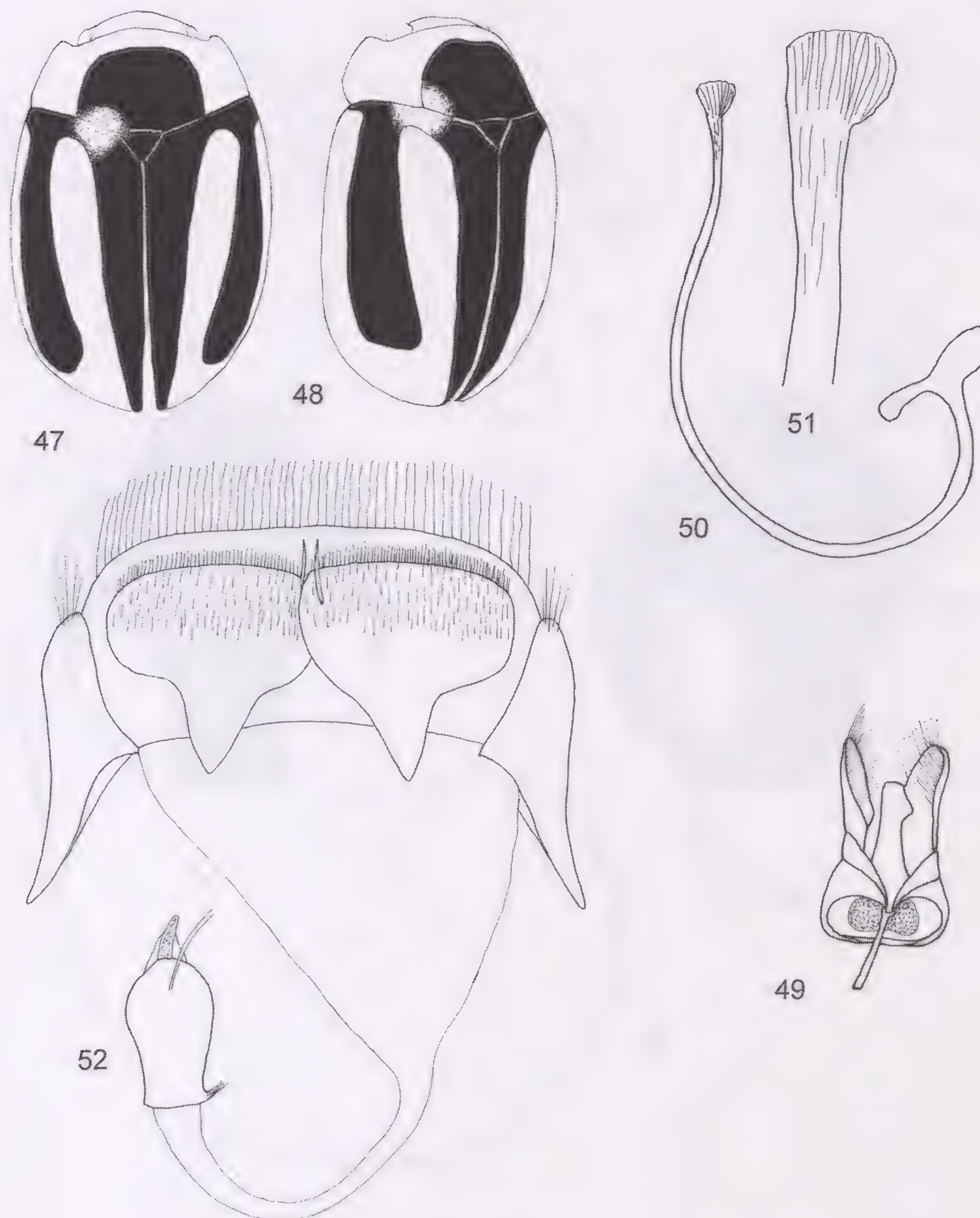
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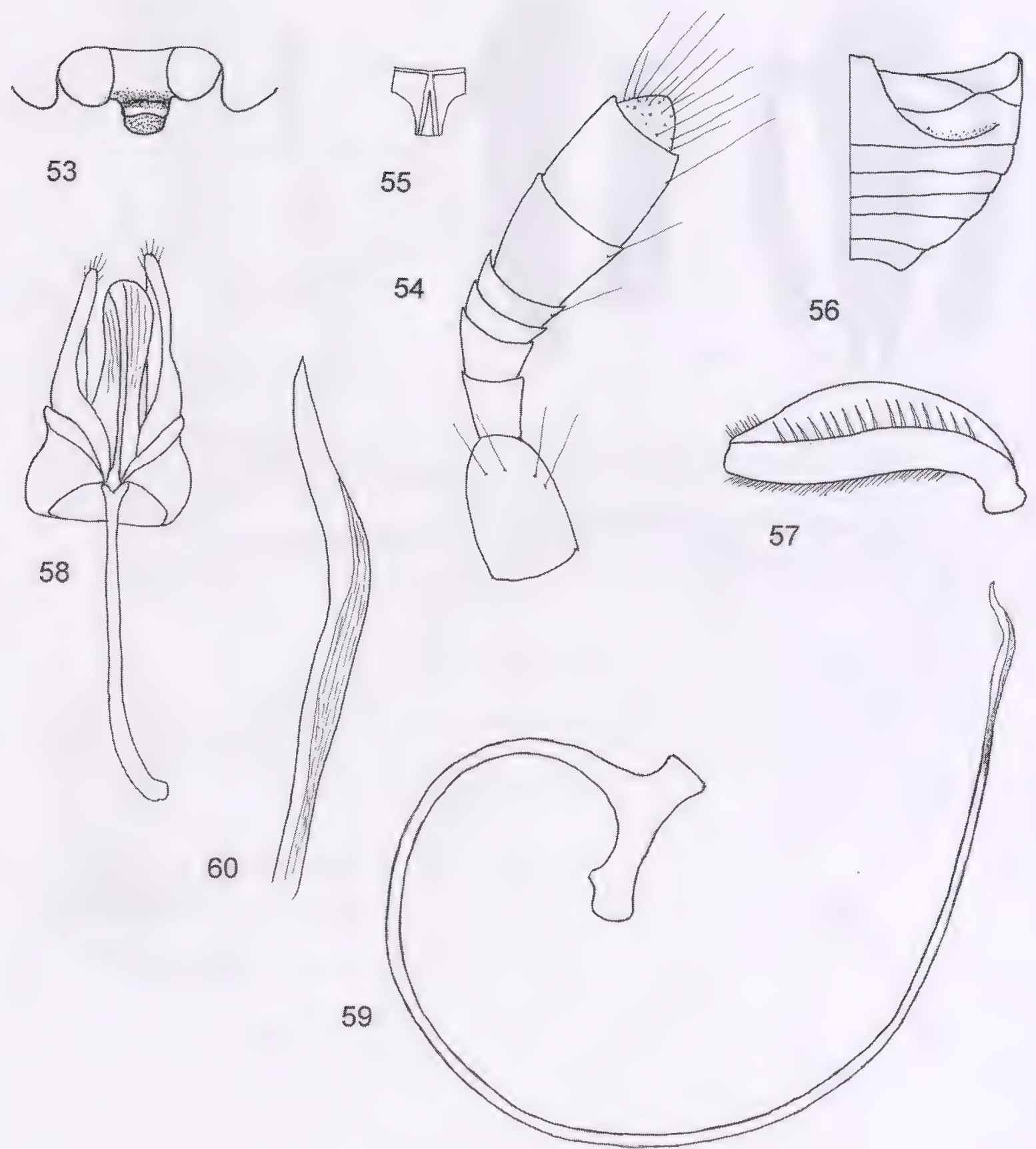
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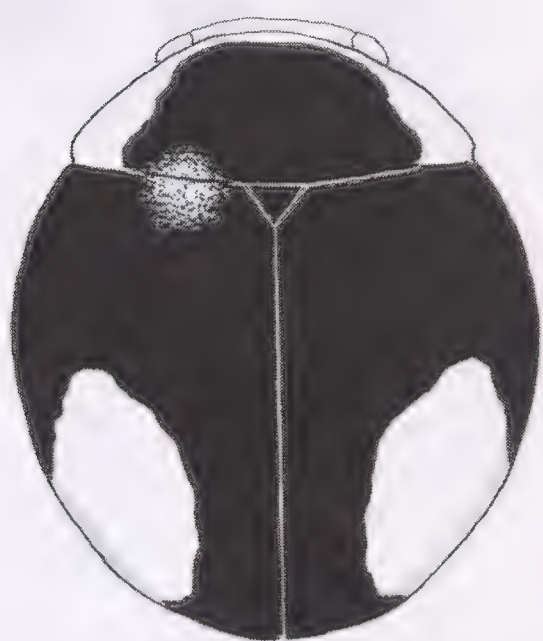
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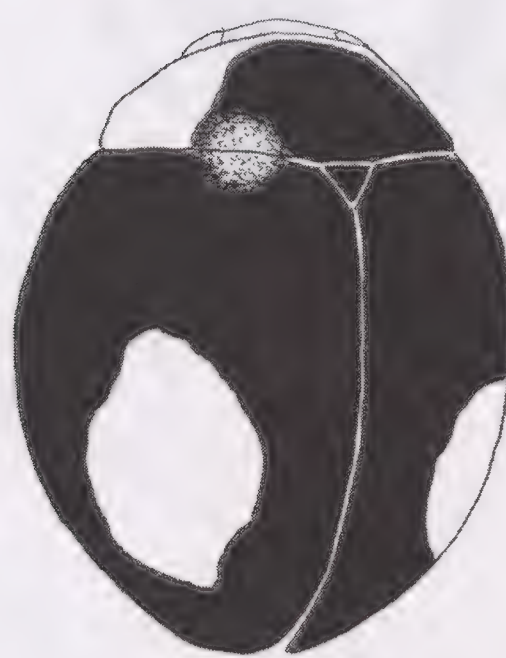
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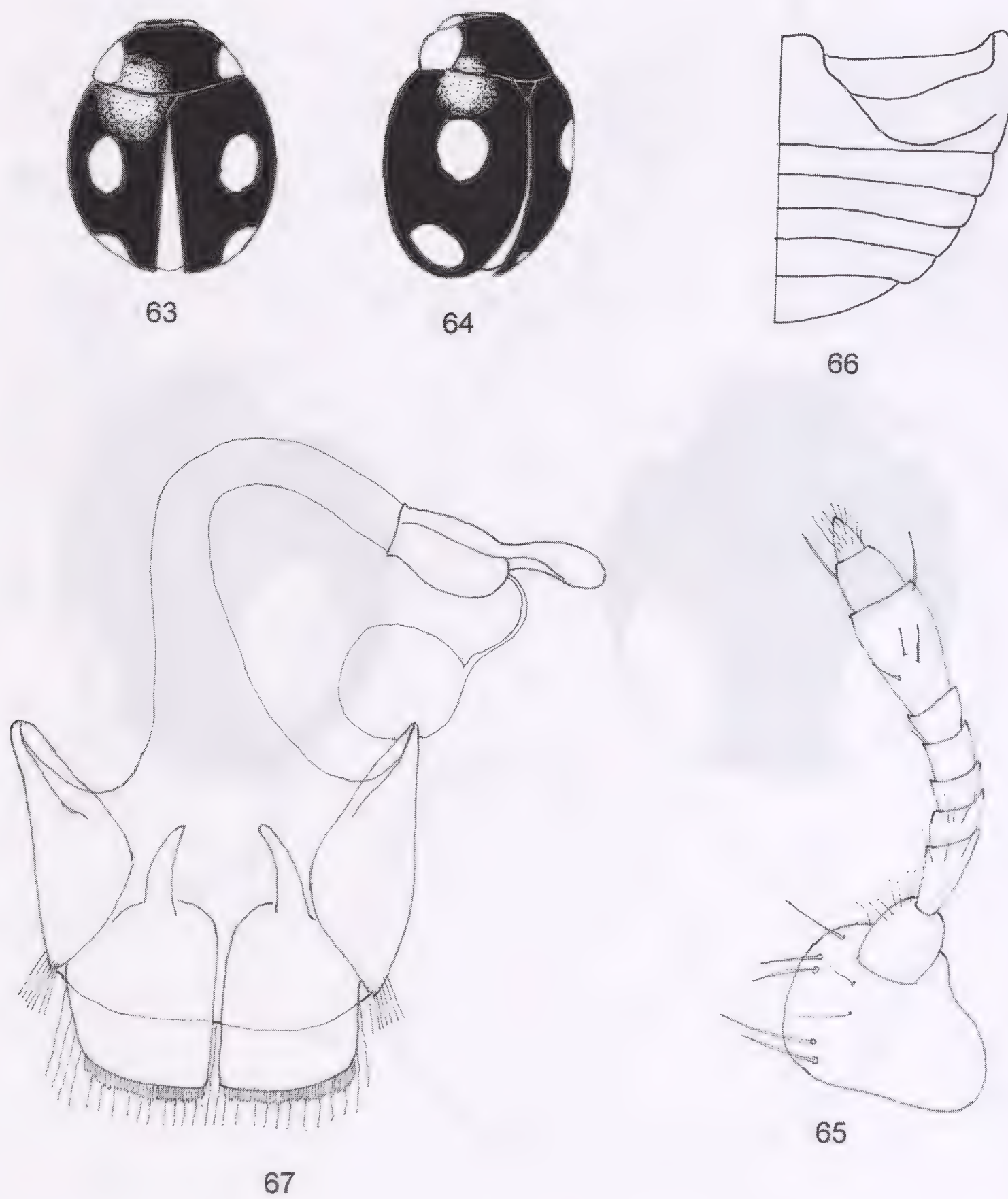


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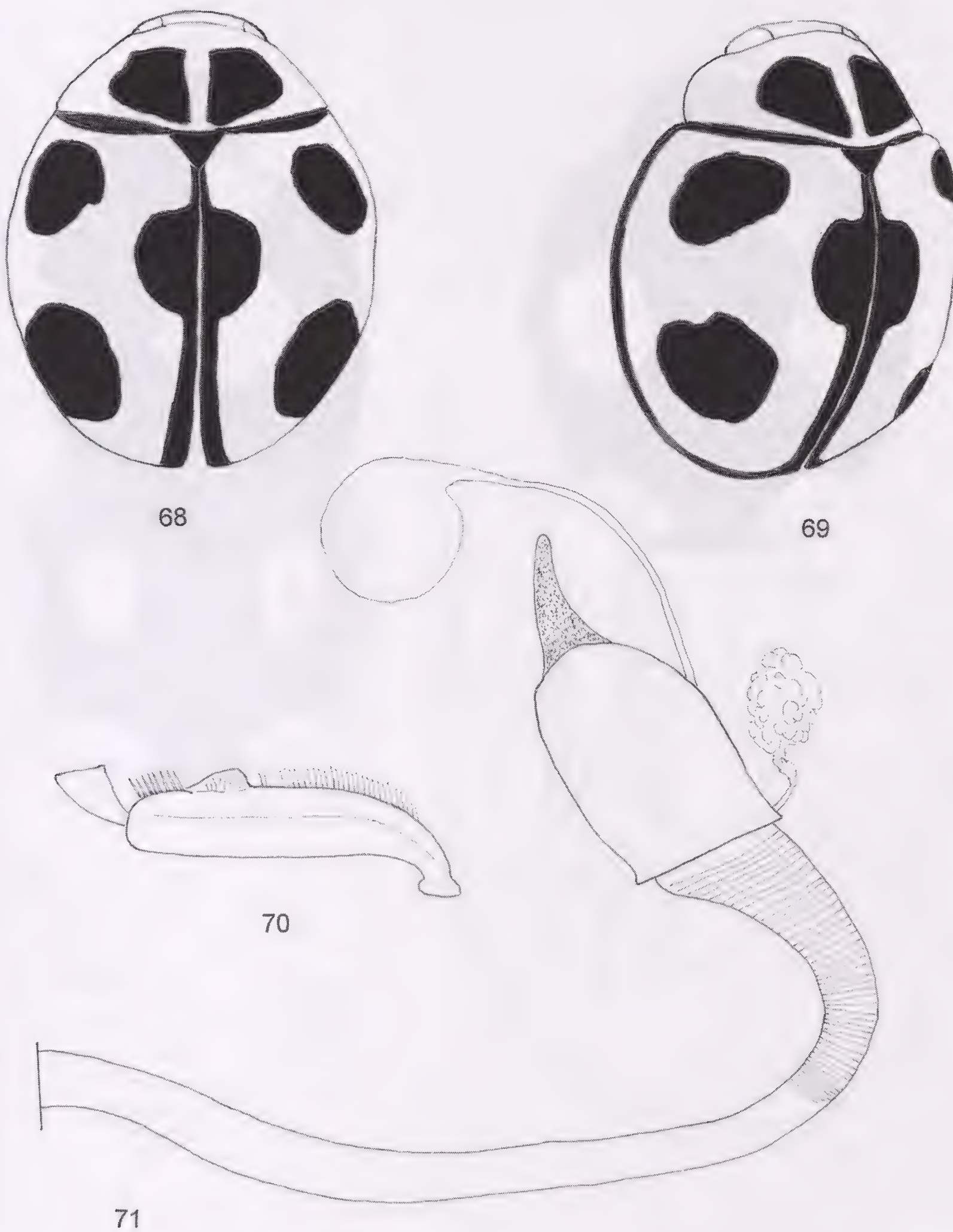


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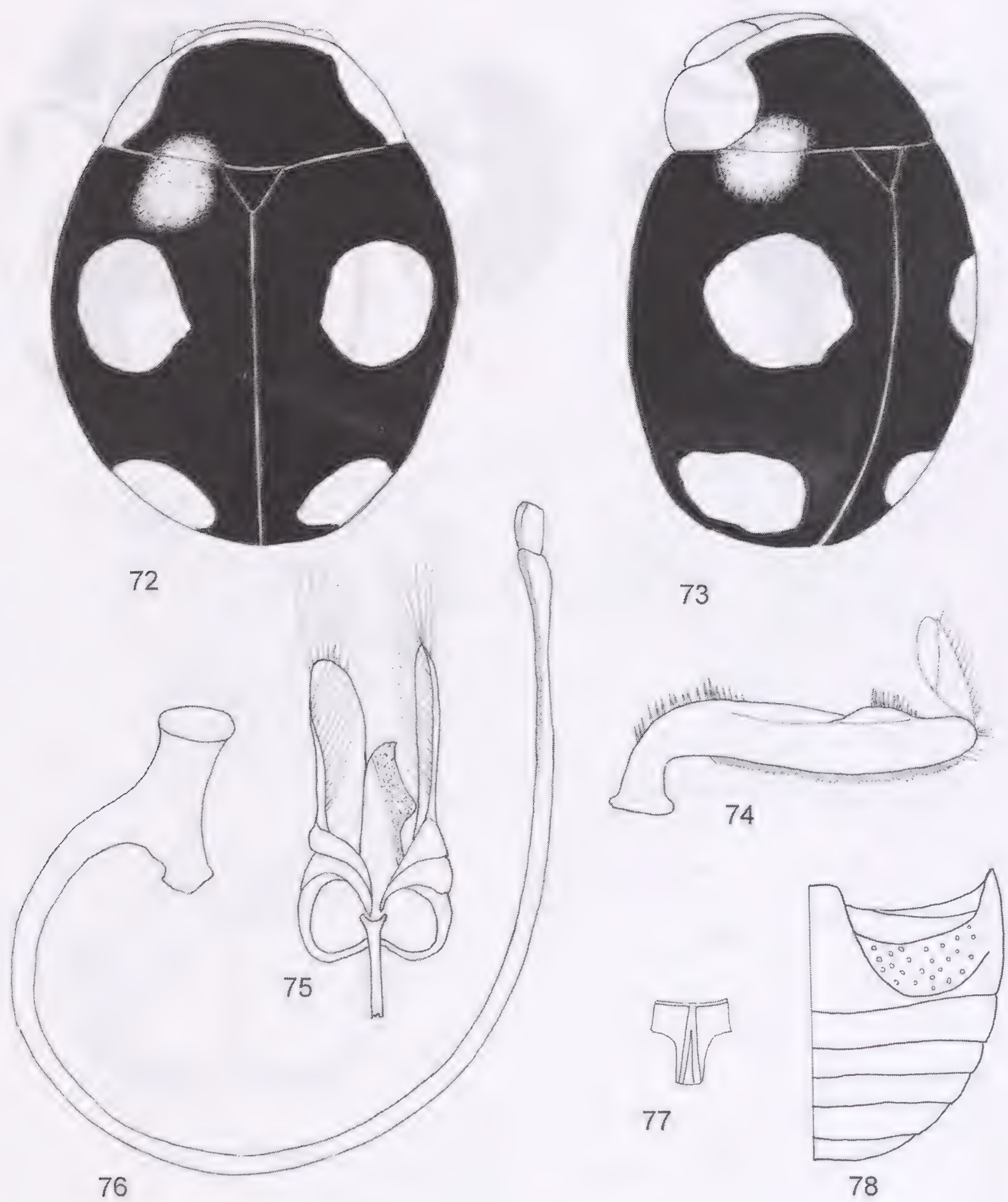
Figs. 61-62 - *Prognataspis surreptiva* habitus.



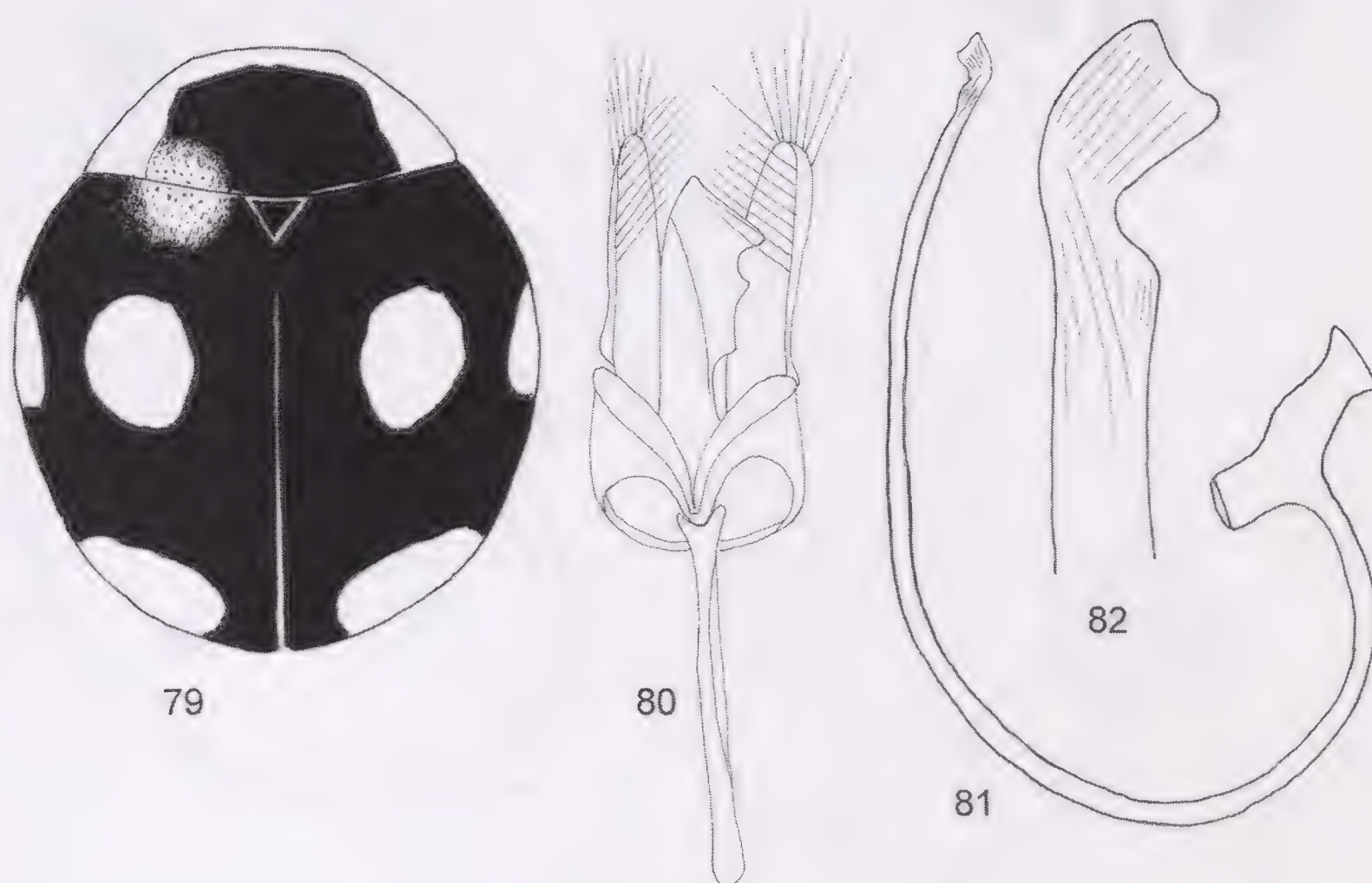
Figs. 63-67 - *Peruaspis paprzyckii* structures. 63-64, habitus. 65, antenna. 66, abdomen. 67, female genitalia.



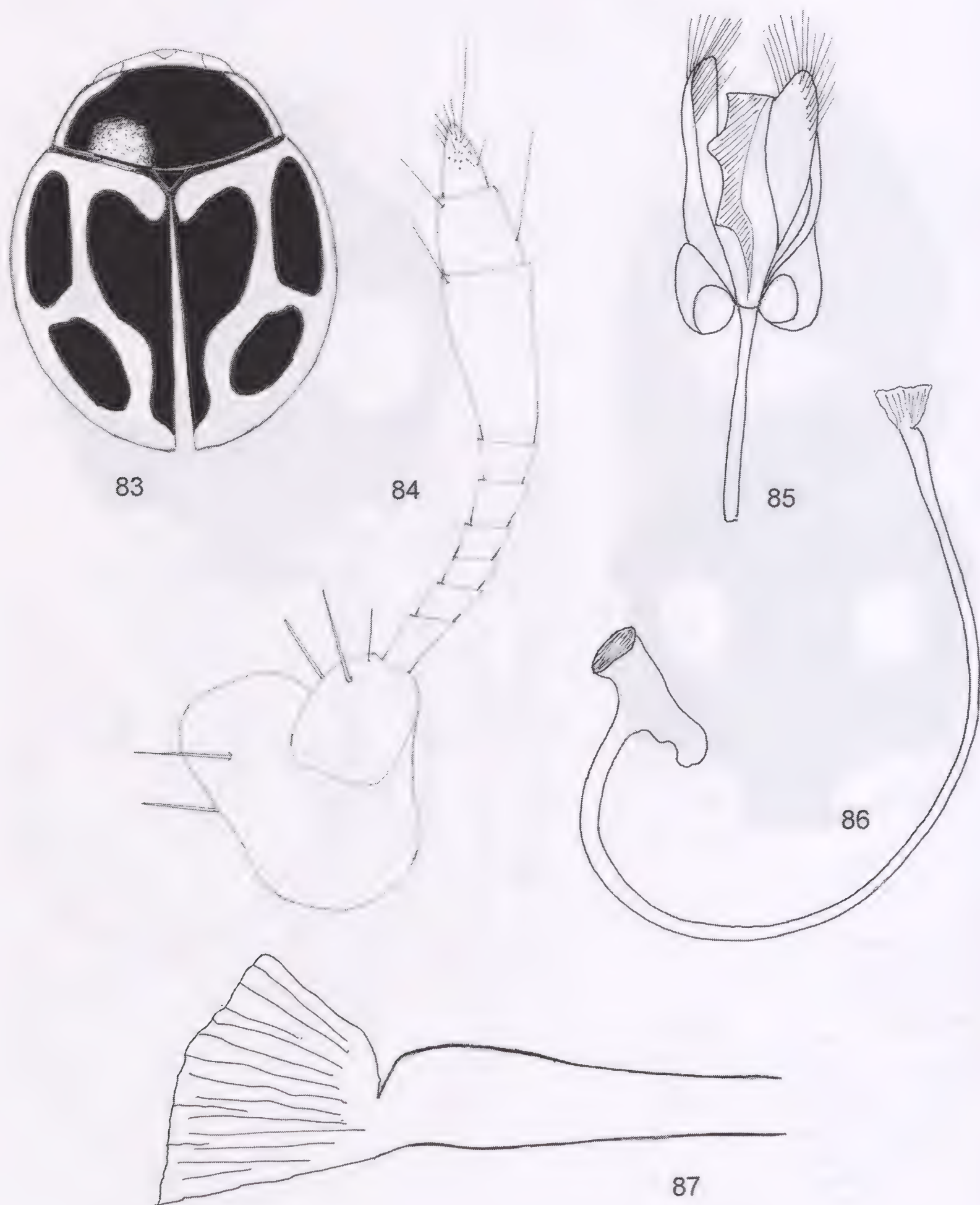
Figs. 68-71 - *Peruaspis hypocrita* structures. 68-69, habitus. 70, protibia. 71, female genitalia, genital plates not shown.



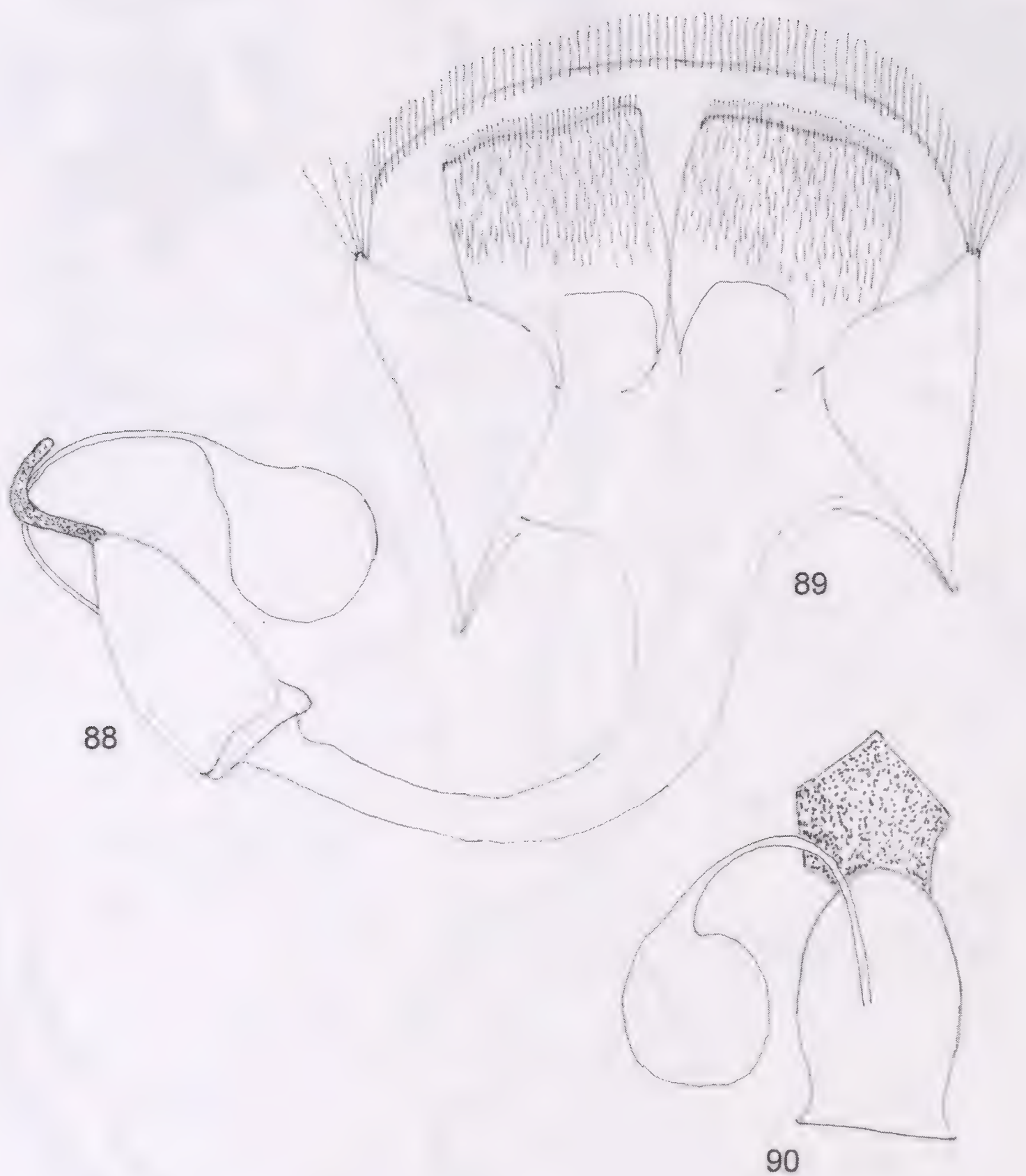
Figs. 72-78 - *Hyperaspis latitibia* and *H. reppensis* structures. 72-76, *H. latitibia*. 72-73, habitus. 74, protibia. 75-76, male genitalia. 75, phallobase; 76, siphon. 77-78, *H. reppensis*. 77, prosternum. 78, abdomen.



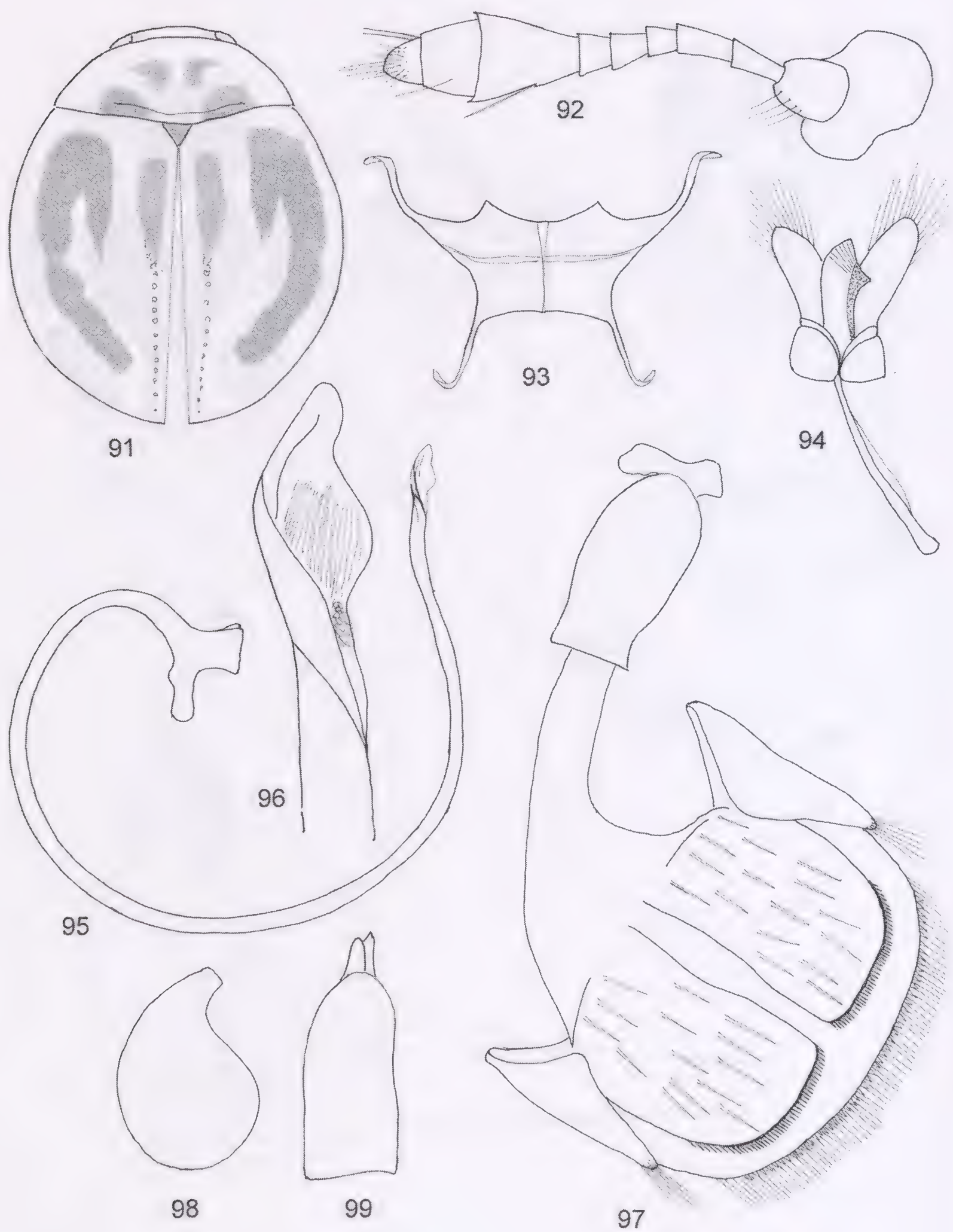
Figs. 79-82 - *Hyperaspis donzeli* habitus and genitalia. 79, habitus. 80-82, male genitalia. 80, phallobase; 81, siphon; 82, enlarged siphonal apex.



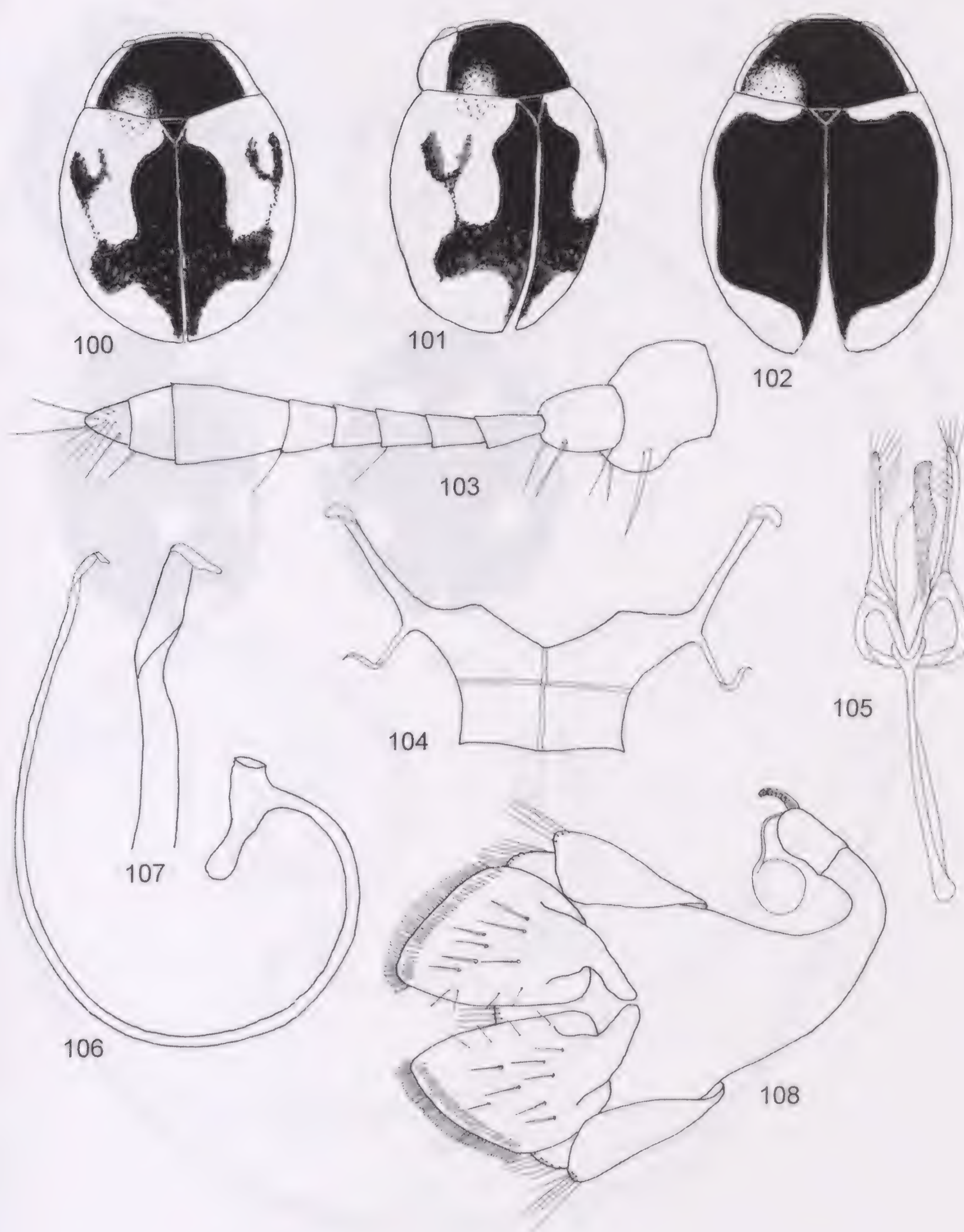
Figs. 83-87 - *Hyperaspis matronata* structures. 83, habitus. 84, antenna. 85-87, male genitalia. 85, phallobase; 86, siphon; 87, enlarged siphonal apex.



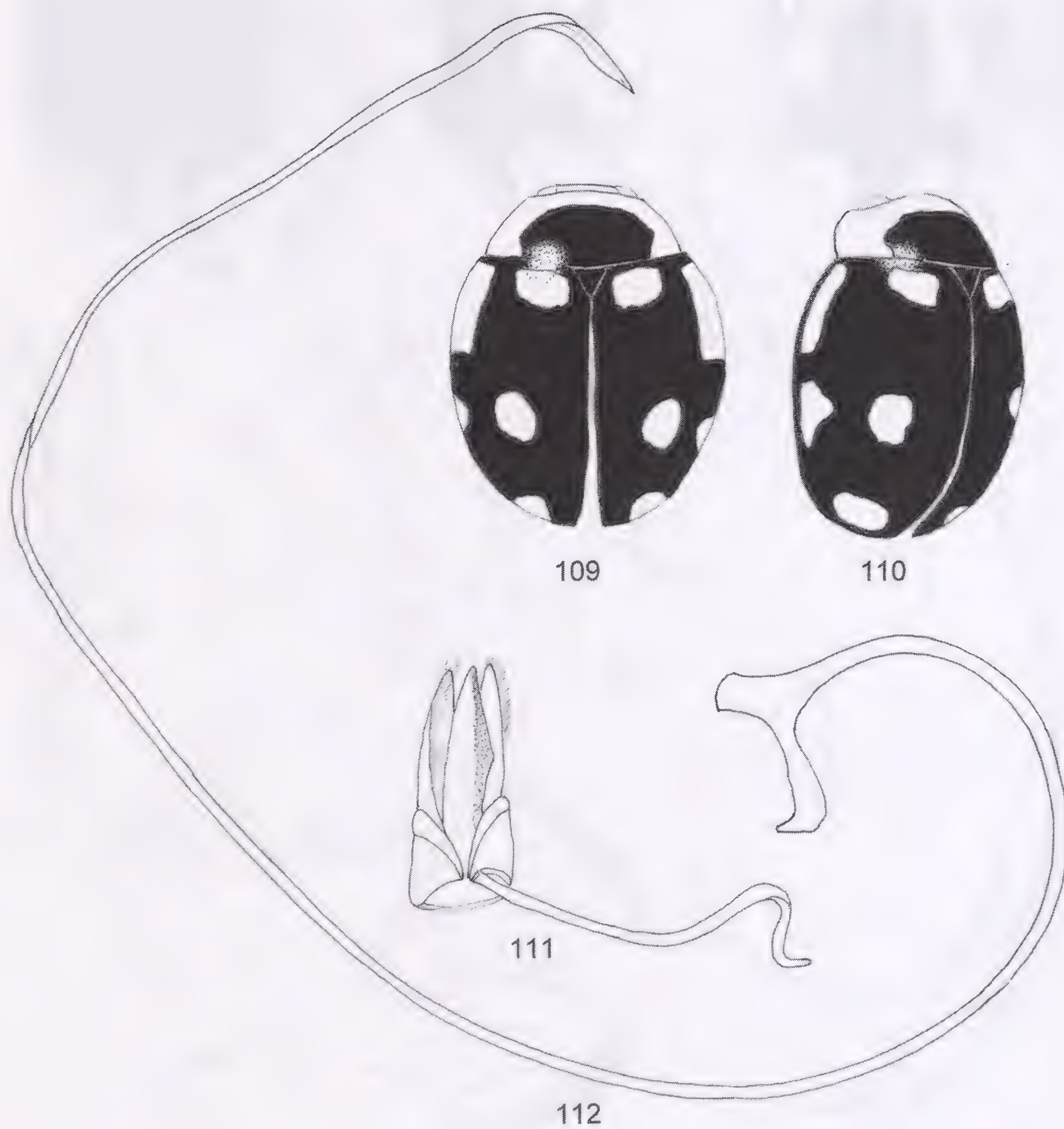
Figs. 88-90 - *Hyperaspis matronata* female genitalia. 88, spermathecal capsule, frontal view; 89, genital plates; 90, genital capsule, lateral view.



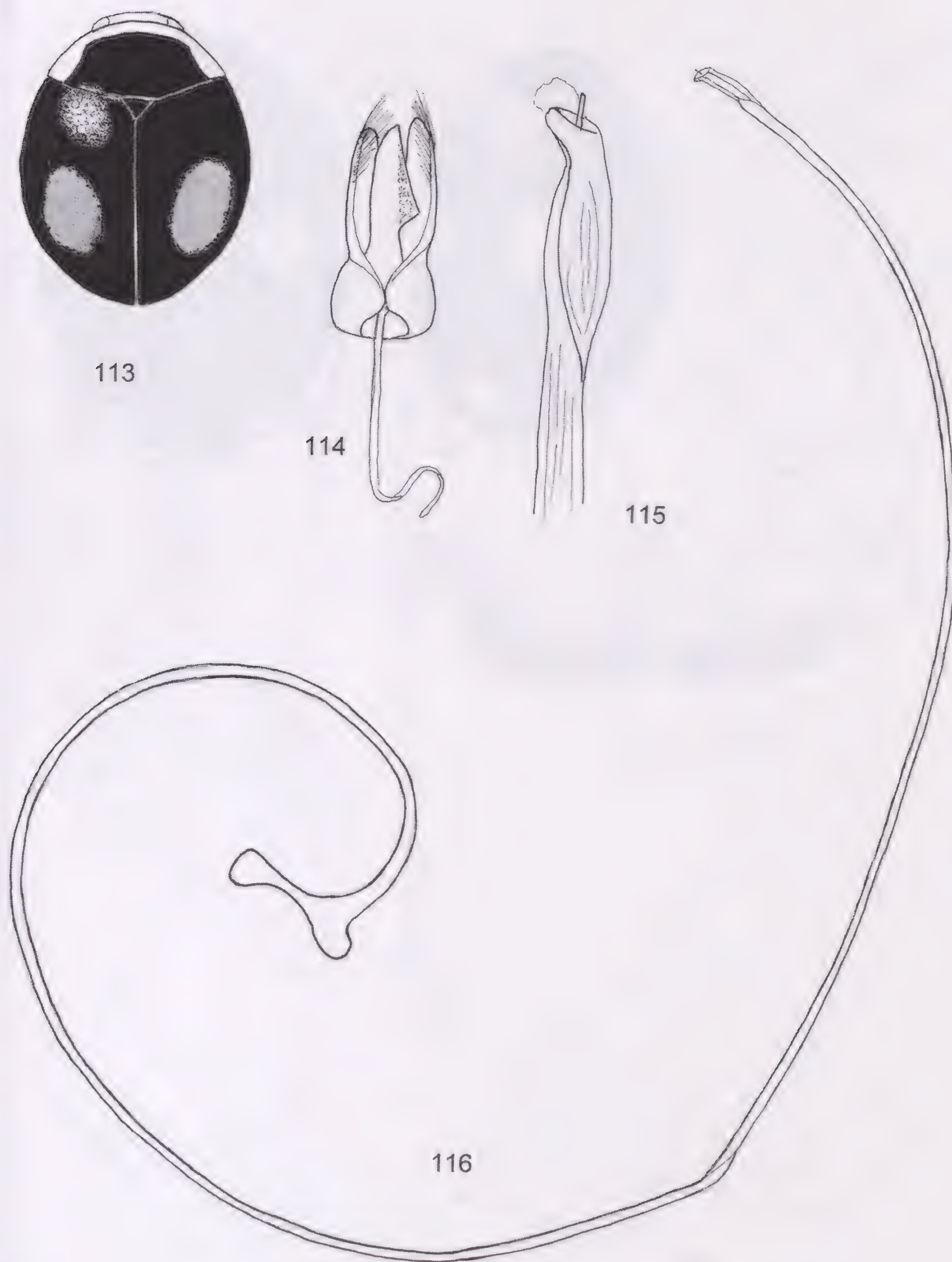
Figs. 91-99 - *Hyperaspis helveola* structures. 91, habitus. 92, antenna. 93, metendosternite. 94-96, male genitalia. 94, phallobase; 95, siphon; 96, enlarged siphonal apex. 97-99, female genitalia. 97, entire genitalia showing basal portion in ventral view; 98, distal portion; 99, lateral view of basal portion.



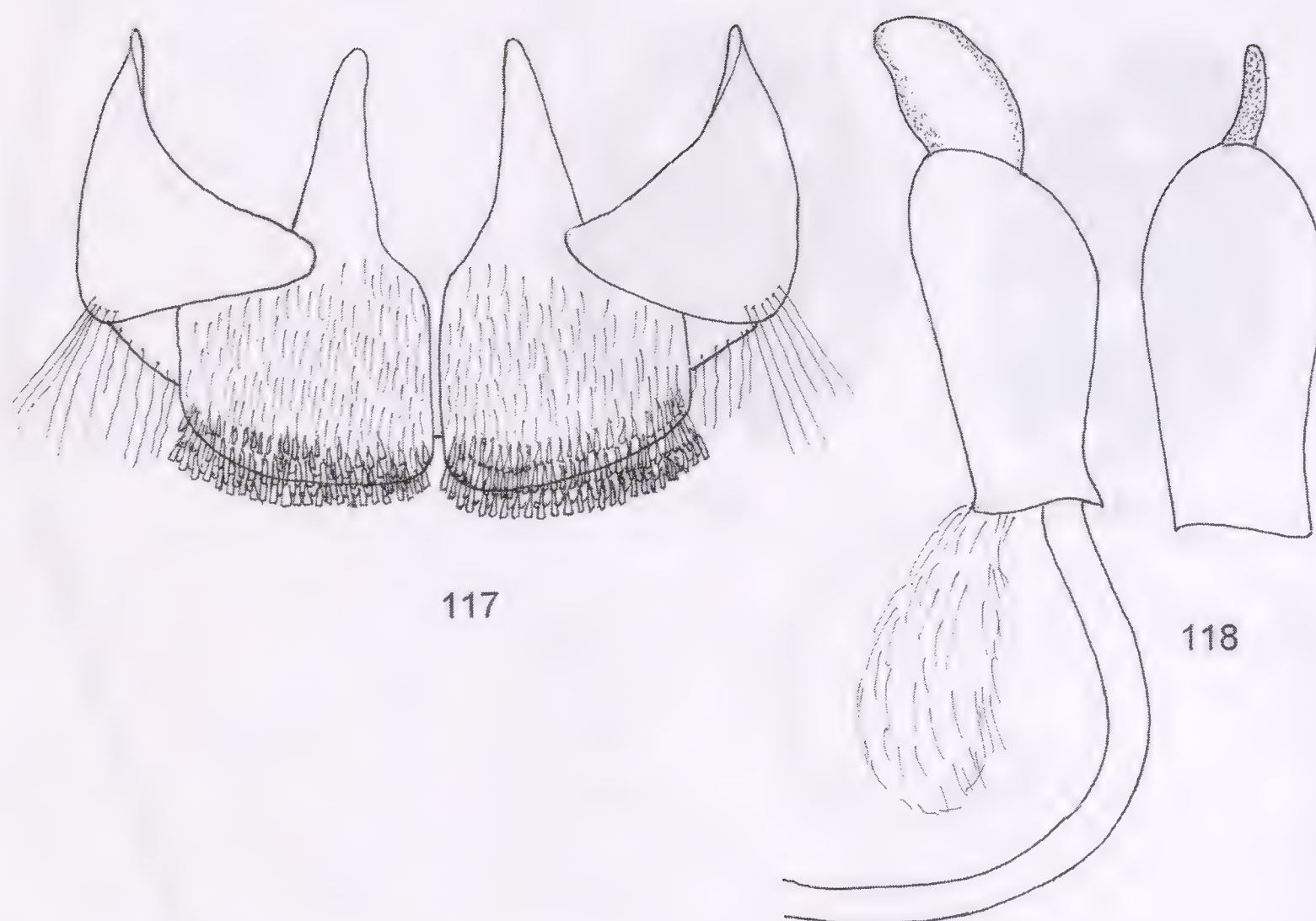
Figs. 100-108 - *Hyperaspis scutifera* structures. 100-102, habitus and variations. 103, antenna. 104, metendosternite. 105-107, male genitalia. 105, phallobase; 106, siphus; 107, enlarged siphonal apex. 108, female genitalia.



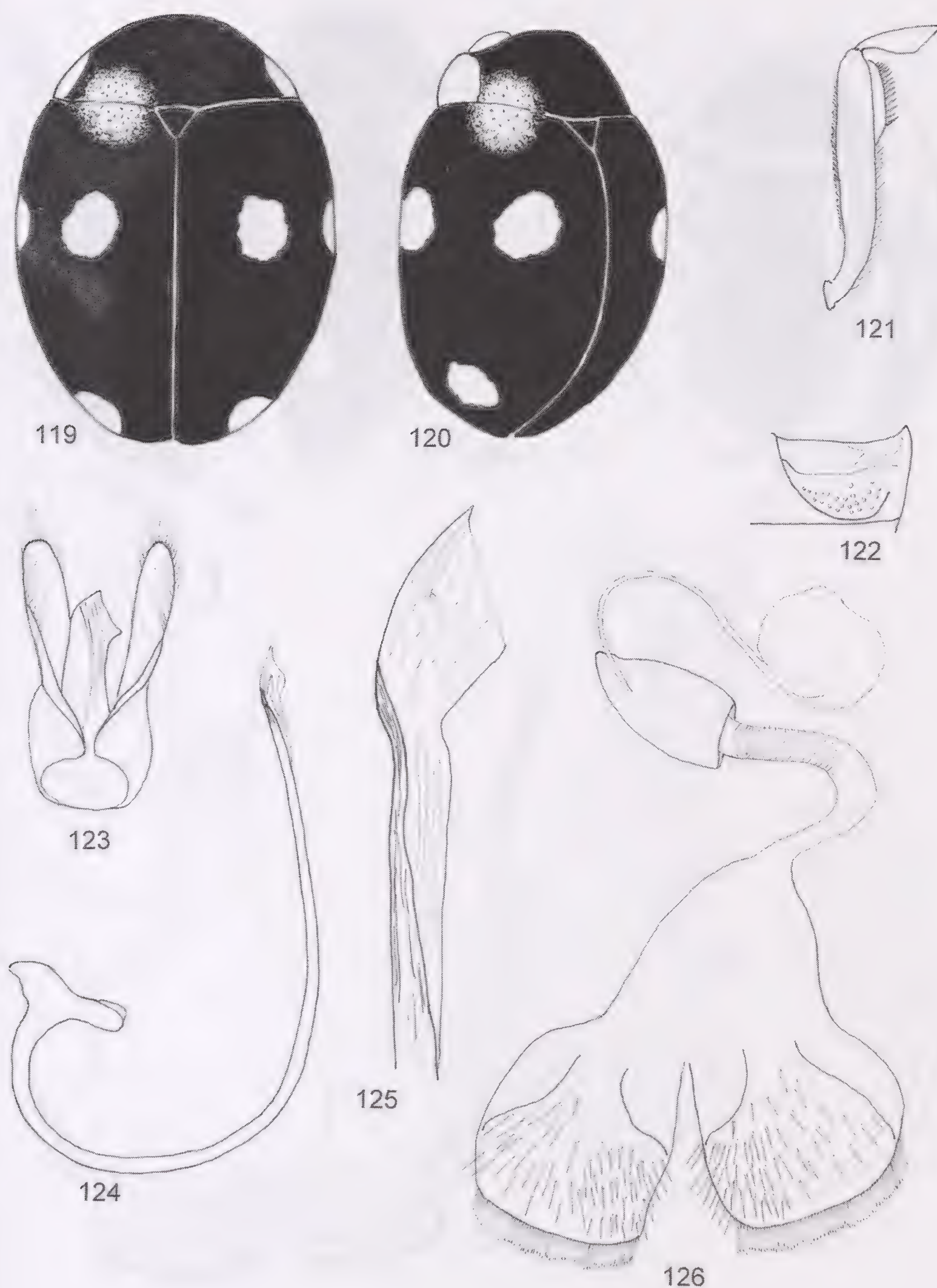
Figs. 109-112 - *Hyperaspis imitatrix* habitus and male genitalia. 109-110, habitus. 111-112, male genitalia. 111, phallobase; 112, siphon.



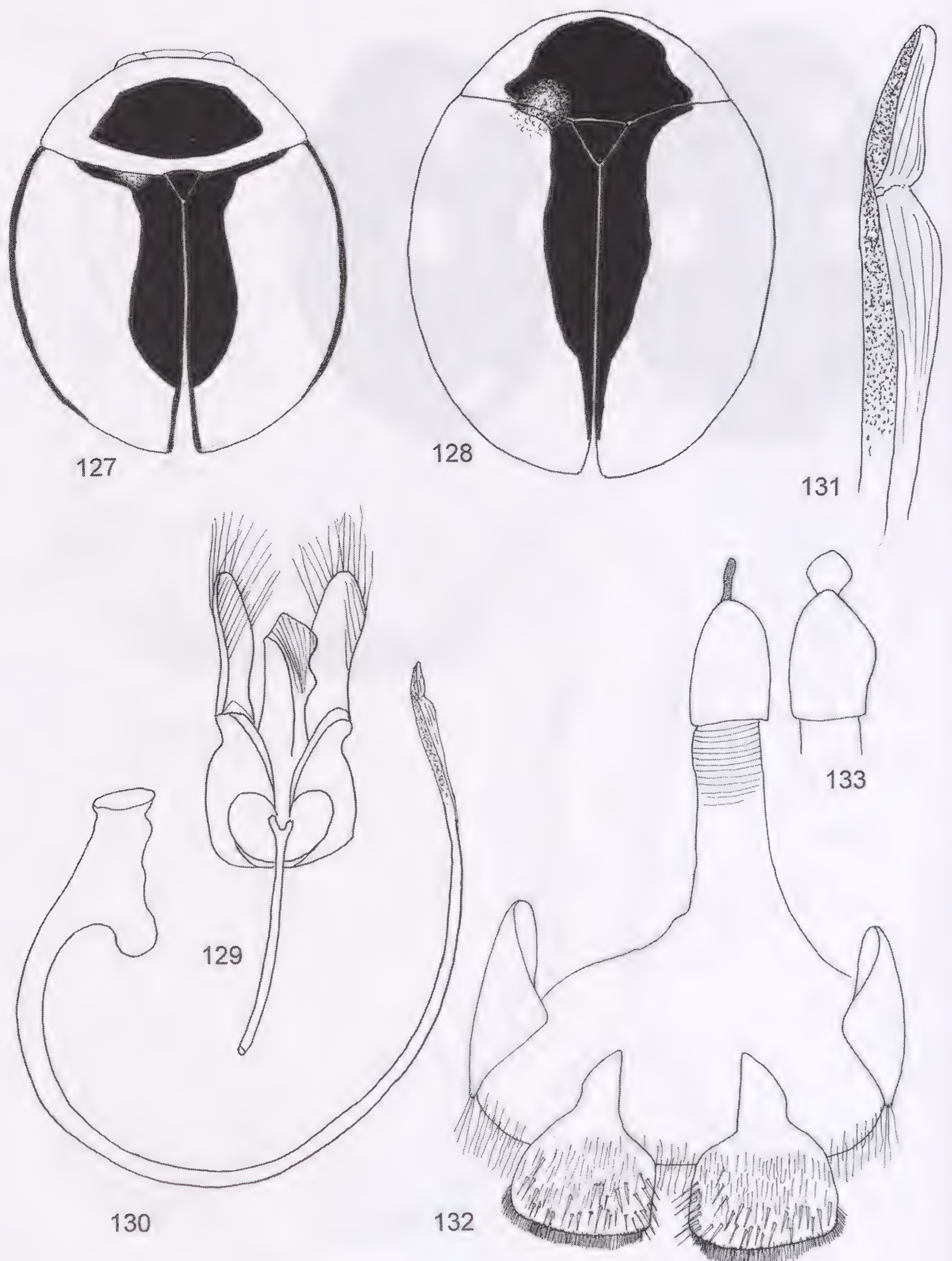
Figs. 113-116 - *Hyperaspis chapini* habitus and genitalia. 113, habitus. 114-116, male genitalia. 114, phallobase; 115, enlarged siphonal apex; 116, siphon.



Figs. 117-118 - *Hyperaspis chapini* female genitalia. 117, genital plates; 118, spermathecal capsule, lateral and frontal views.



Figs. 119-126 - *Hyperaspis cracentis* structures. 119-120, habitus. 121, protibia. 122, abdomen. 123-125, male genitalia. 123, phallobase; 124, siphon, 125, enlarged siphonal apex. 126, female genitalia.



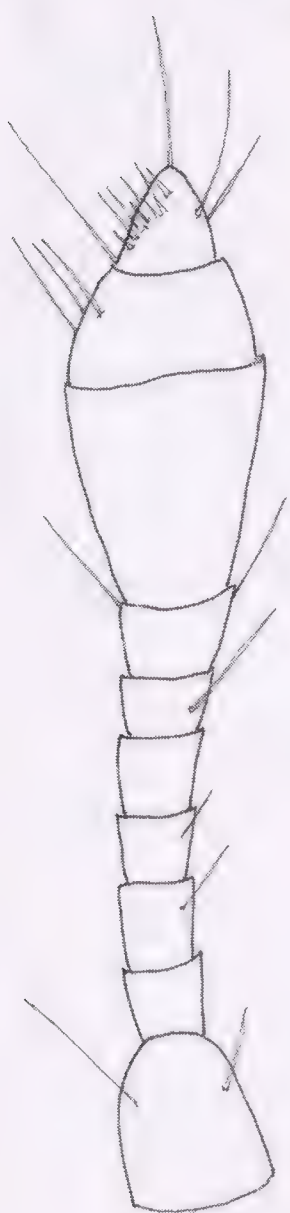
Figs. 127-133 - *Hyperaspis operaria* habitus and genitalia. 127-128, habitus. 129-131, male genitalia. 129, phallobase; 130, siphon; 131, enlarged siphonal apex. 132-133, female genitalia. 132, complete genitalia; 133, basal unit, lateral view.



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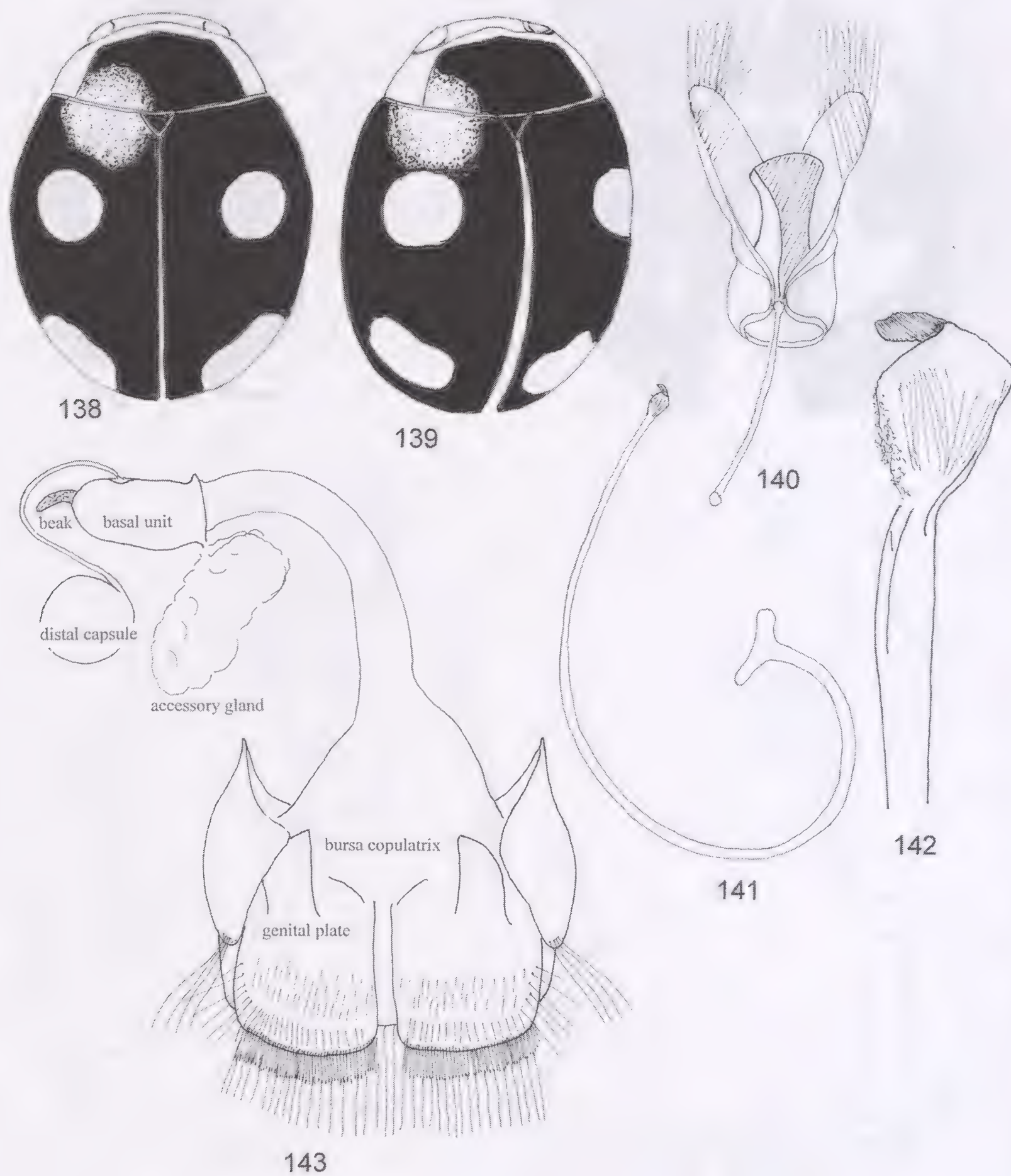


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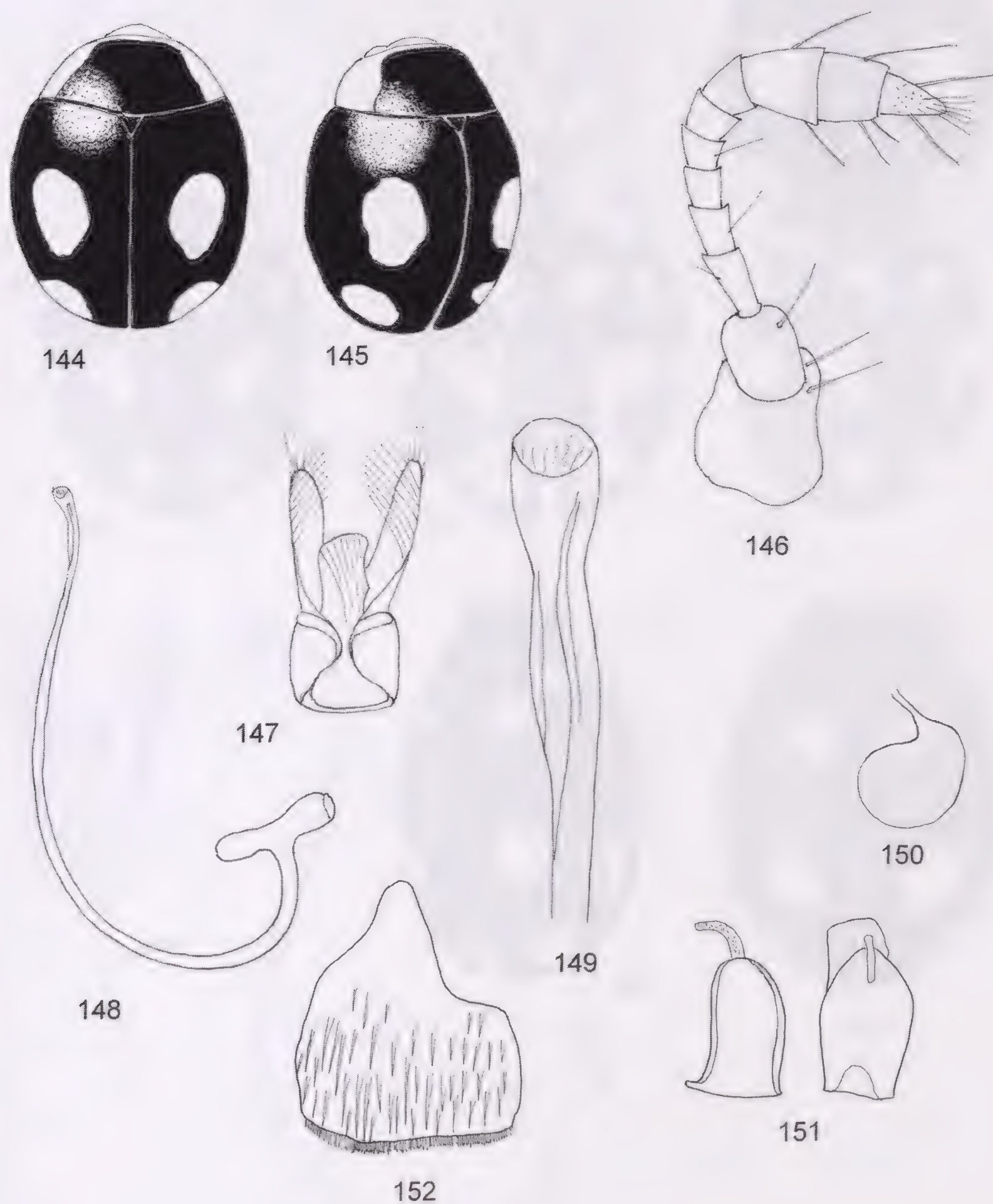


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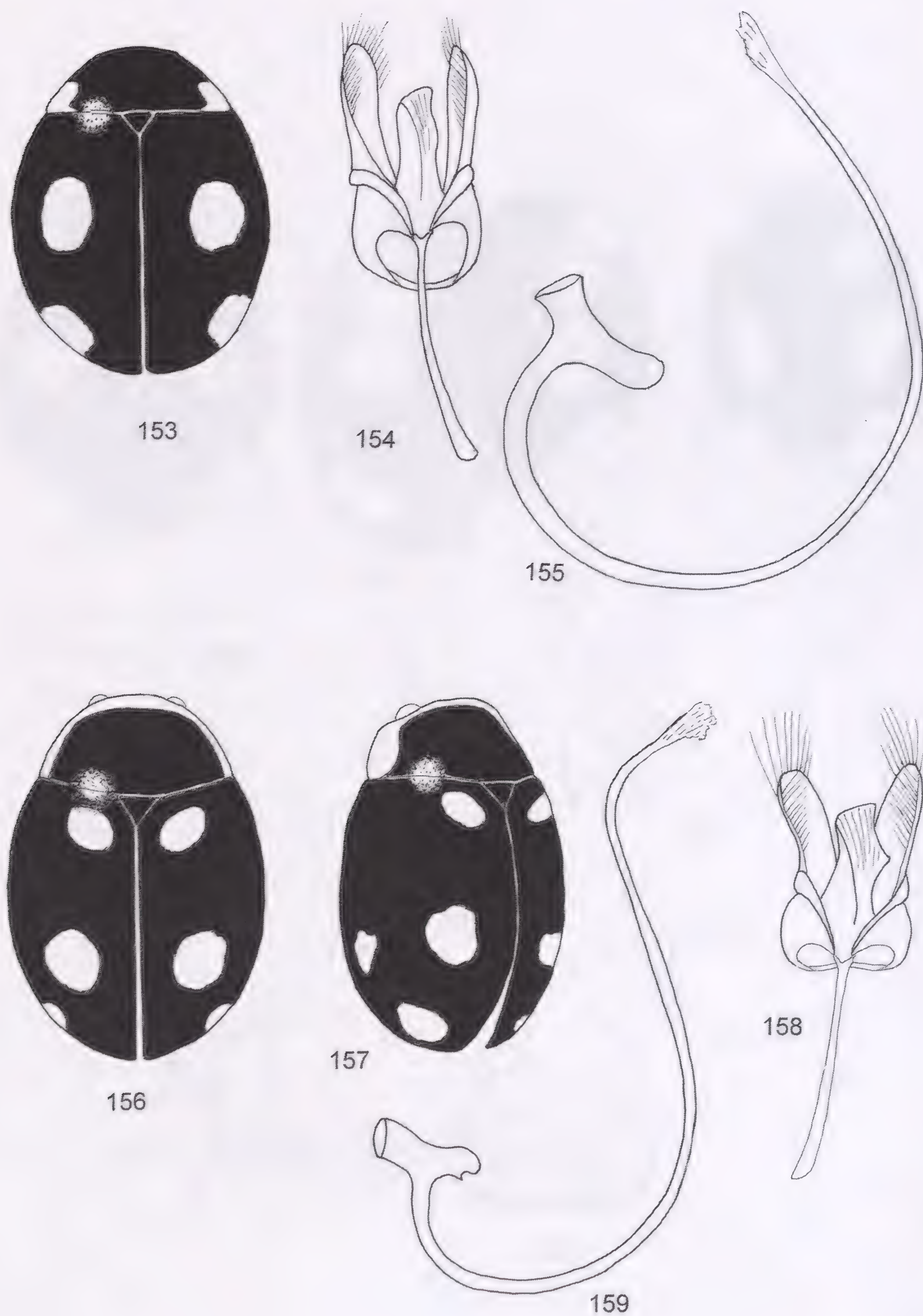
Figs. 134-137 - *Hyperaspis limbigera* structures. 134-135, habitus. 136, antenna, basal article missing. 137, female genitalia.



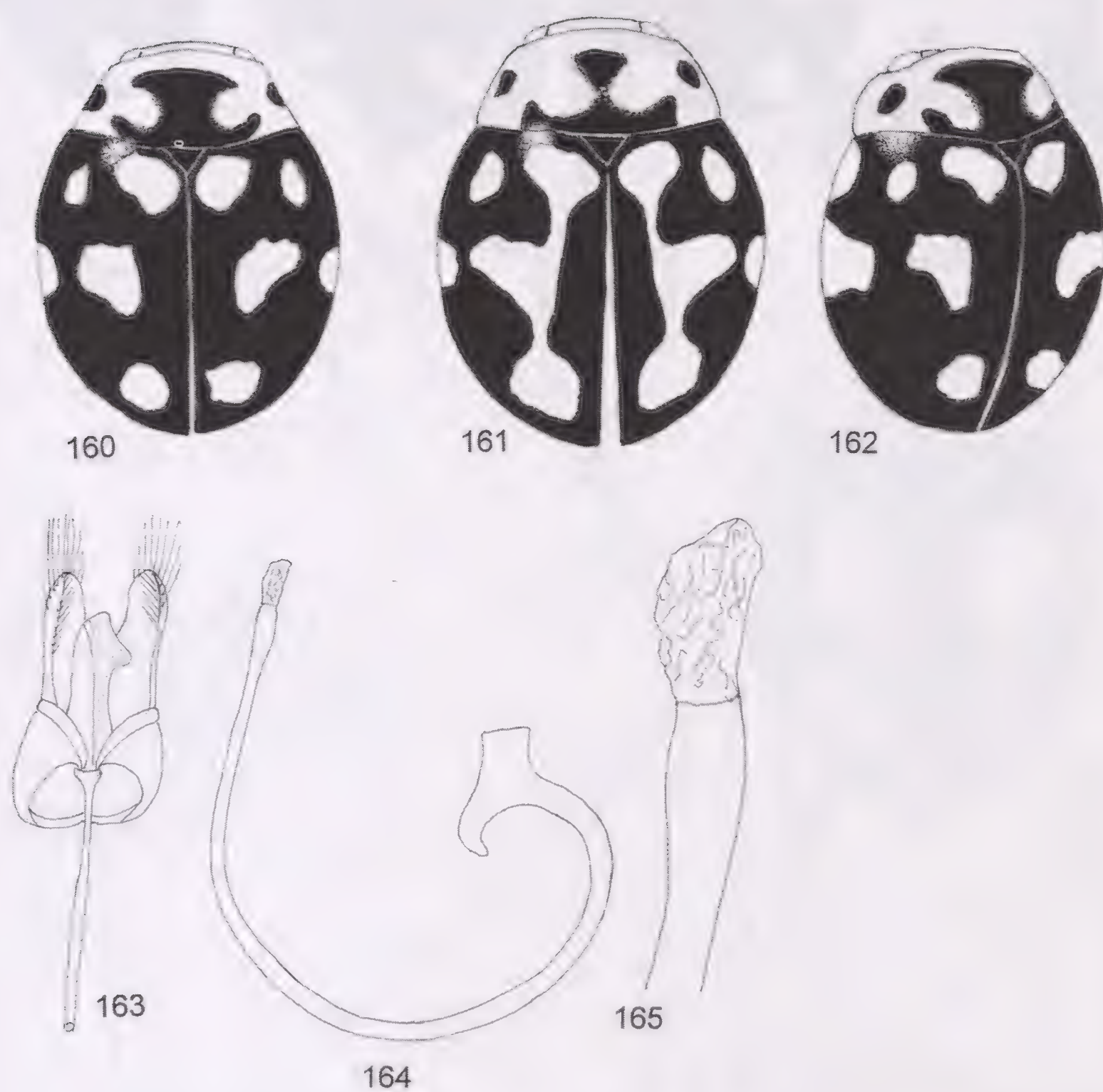
Figs. 138-143 - *Hyperaspis bisignata* habitus and genitalia. 138-139, habitus. 140-142, male genitalia. 140, phallobase; 141, siphon; 142, enlarged siphonal apex. 143, female genitalia.



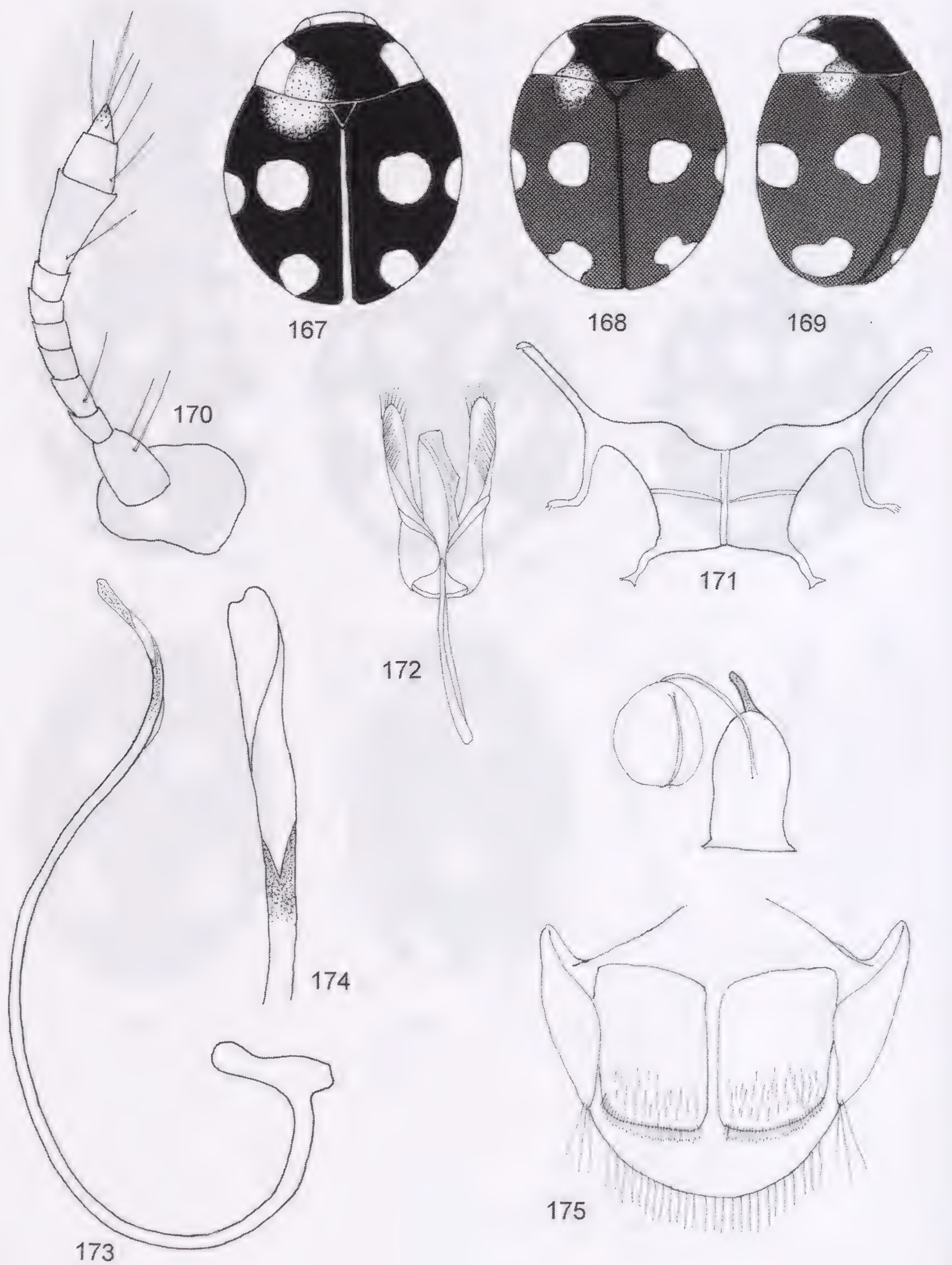
Figs. 144-152 - *Hyperaspis camargoi* structures. 144-145, habitus. 146, antenna. 147-149, male genitalia. 147, phallobase; 148, siphon; 149, enlarged siphonal apex. 150-152, female genitalia. 150, distal portion; 151, basal portion, ventral and lateral view; 152, genital plate.



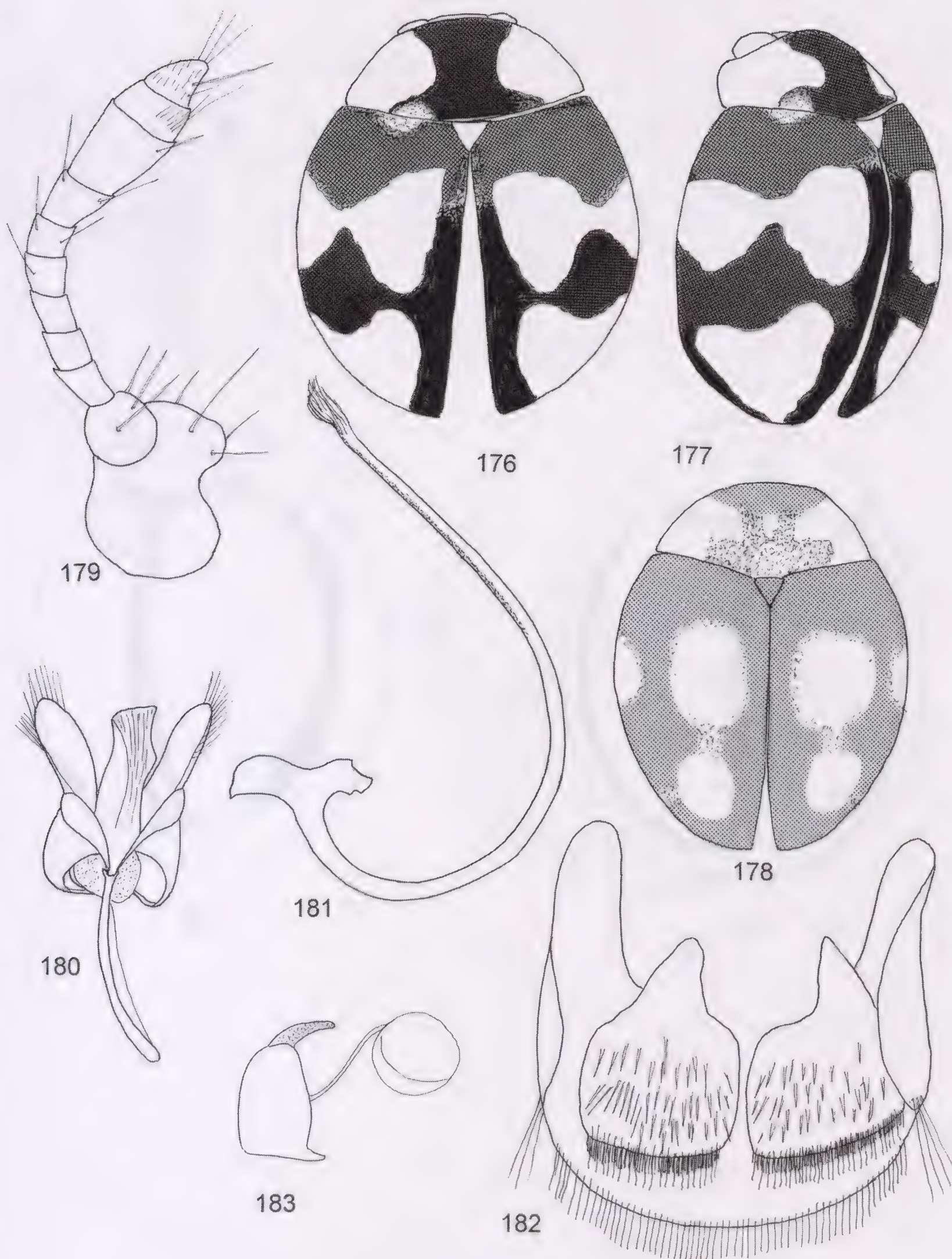
Figs. 153-159 - *Hyperaspis biguttata* and *H. cleida* habitus and male genitalia. 153-155, *H. biguttata*. 153, habitus. 154-155, male genitalia. 154, phallobase; 155, siphus. 156-159, *H. cleida*. 156-157, habitus. 158-159, male genitalia. 158, phallobase; 159, siphus.



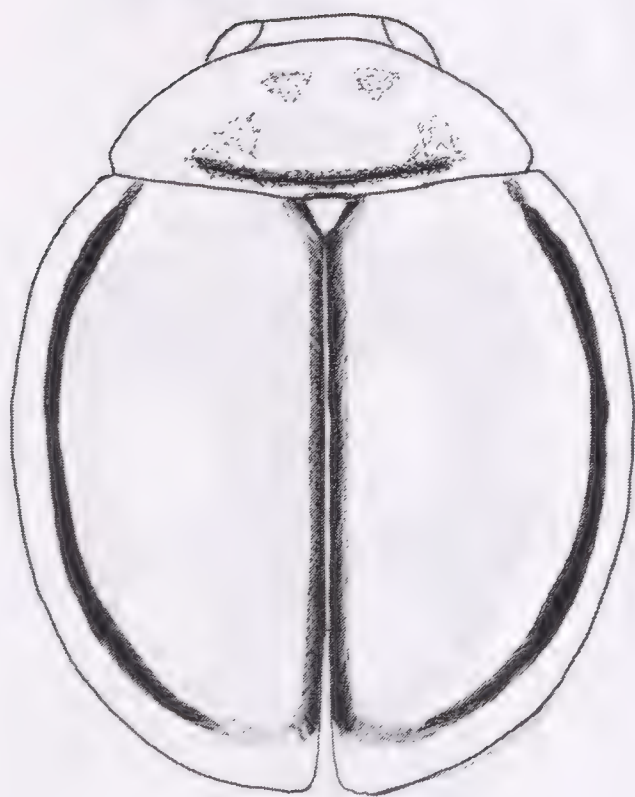
Figs. 160-165 - *Hyperaspis tayronensis* habitus and genitalia. 160-162, habitus and variations. 163-165, male genitalia. 163, phallobase; 164, siphon; 165, enlarged siphonal apex.



Figs. 167-175 - *Hyperaspis pseudodonzeli* structures. 167-169, habitus and variations. 170, antenna. 171, metendosternite. 172-174, male genitalia. 172, phallobase; 173, siphon; 174, enlarged siphonal apex. 175, female genitalia without sperm duct.



Figs. 176-183 - *Hyperaspis orthivora* structures. 176-178, habitus and variations. 179, antenna. 180-181, male genitalia. 180, phallobase; 181, siphus. 182-183, female genitalia. 182, genital plates; 183, basal and distal portions.

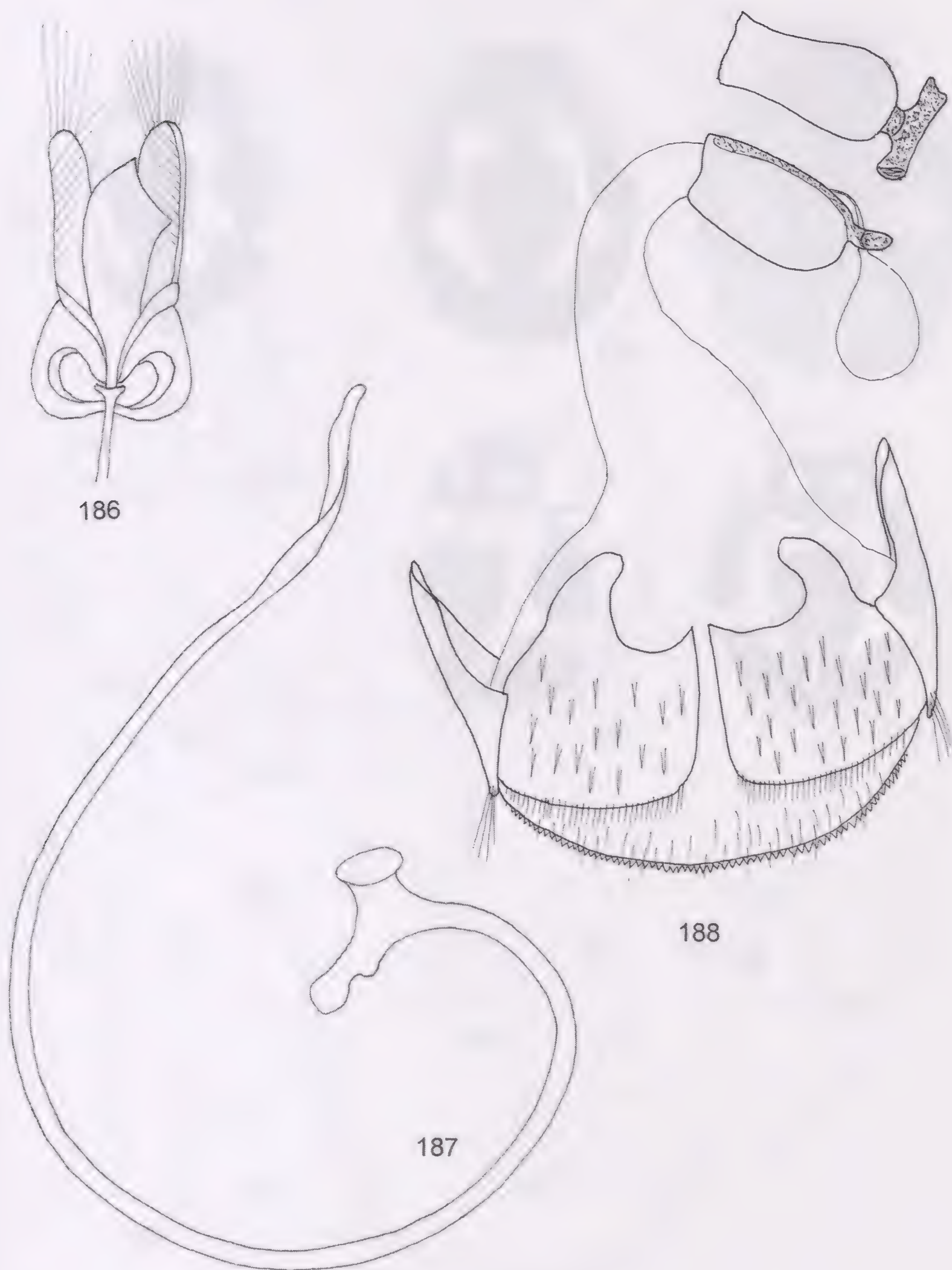


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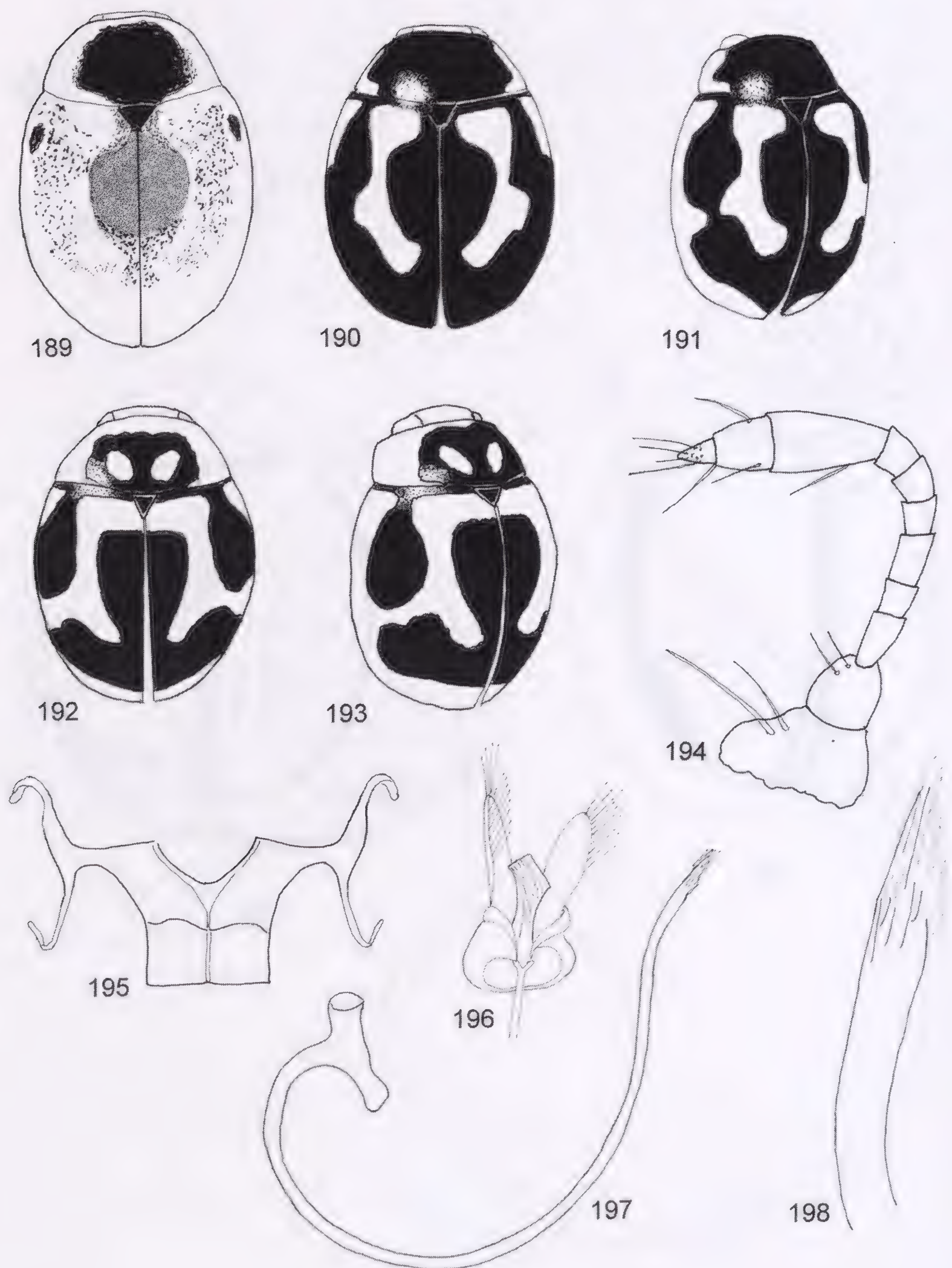


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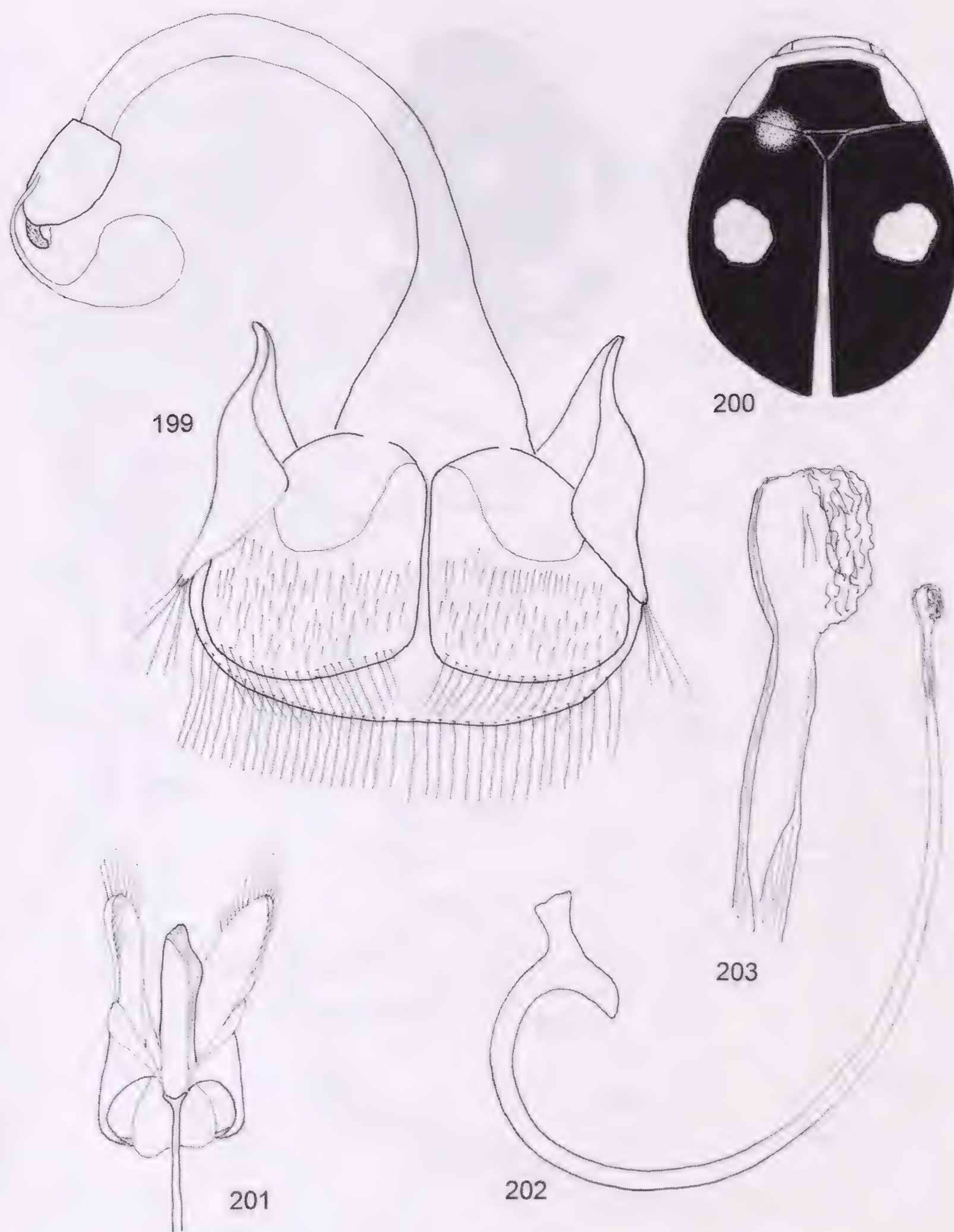
Figs. 184-185 - *Hyperaspis zonula* habitus.



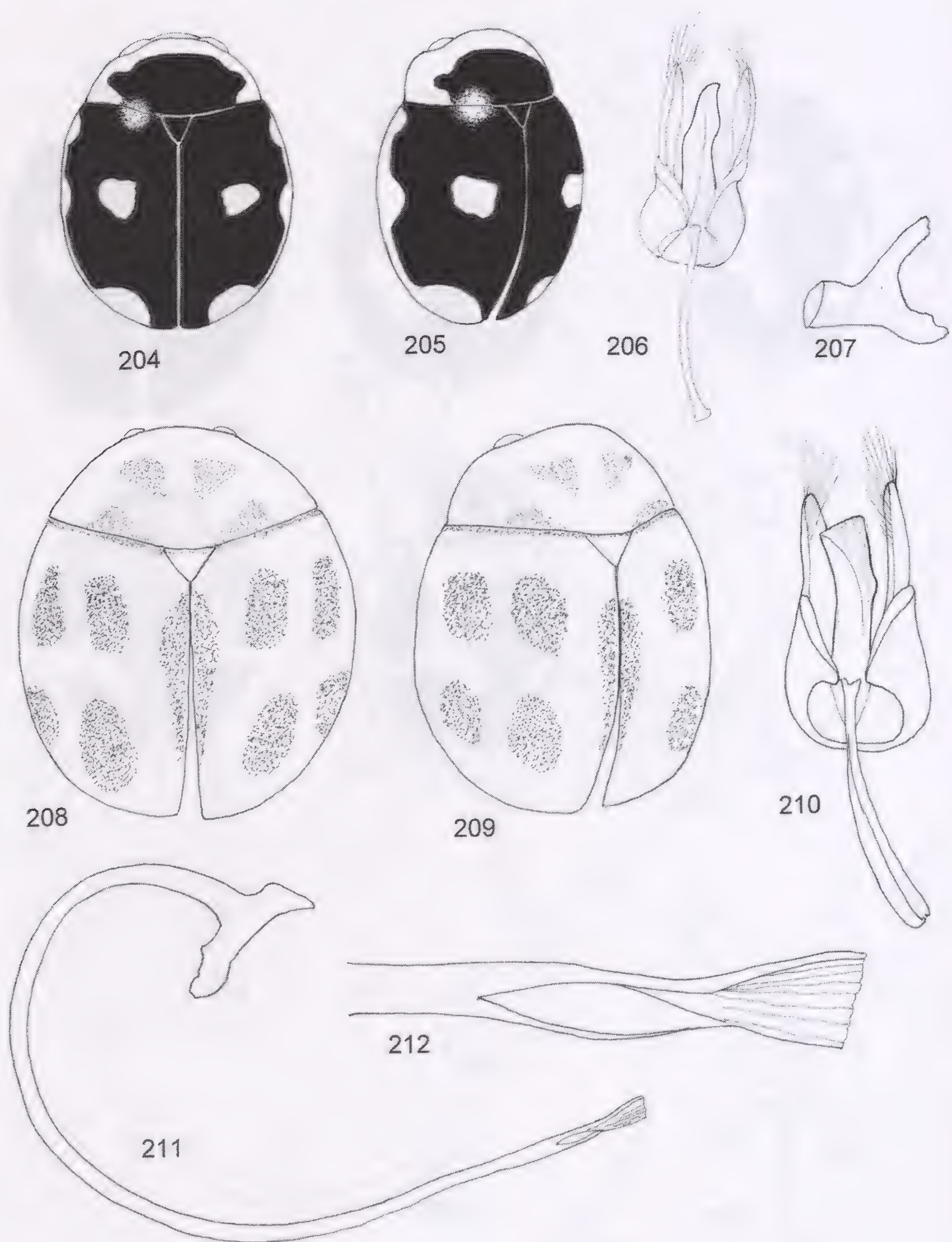
Figs. 186-188 - *Hyperaspis zonula* genitalia. 186-187, male genitalia. 186, phallobase; 187, siphus. 188, female genitalia.



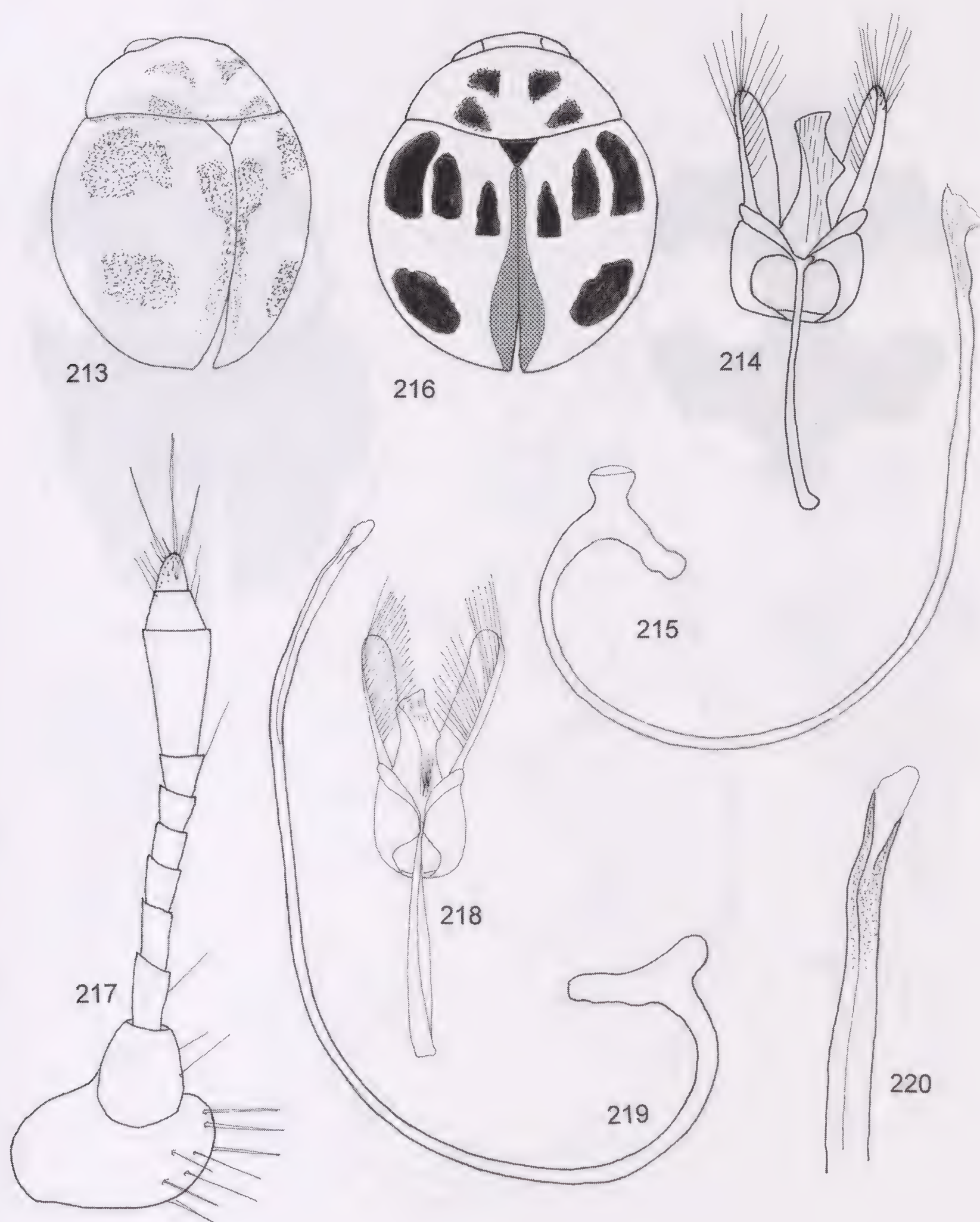
Figs. 189-198 - *Hyperaspis brethesi* structures. 189-193, habitus and variations. 194, antenna. 195, metendosternite. 196-198, male genitalia. 196, phallobase; 197, siphon; 198, enlarged siphonal apex.



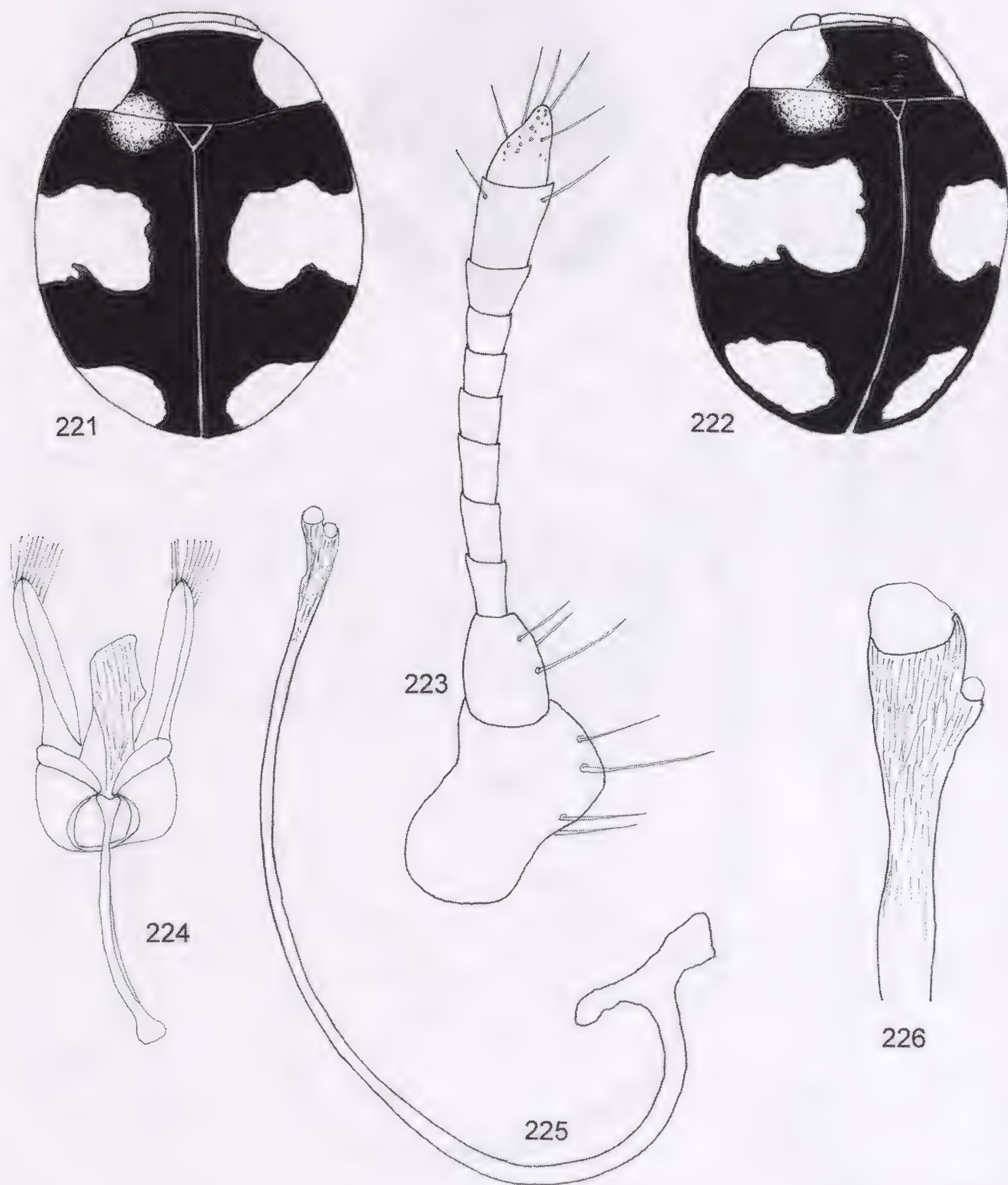
Figs. 199-203 - *Hyperaspis brethesi* female genitalia and *H. rosariensis* habitus and male genitalia. 199, *H. brethesi* female genitalia. 200-203, *H. rosariensis*. 200, habitus. 201-203, male genitalia. 201, phallobase; 202, siphon; 203, enlarged siphonal apex.



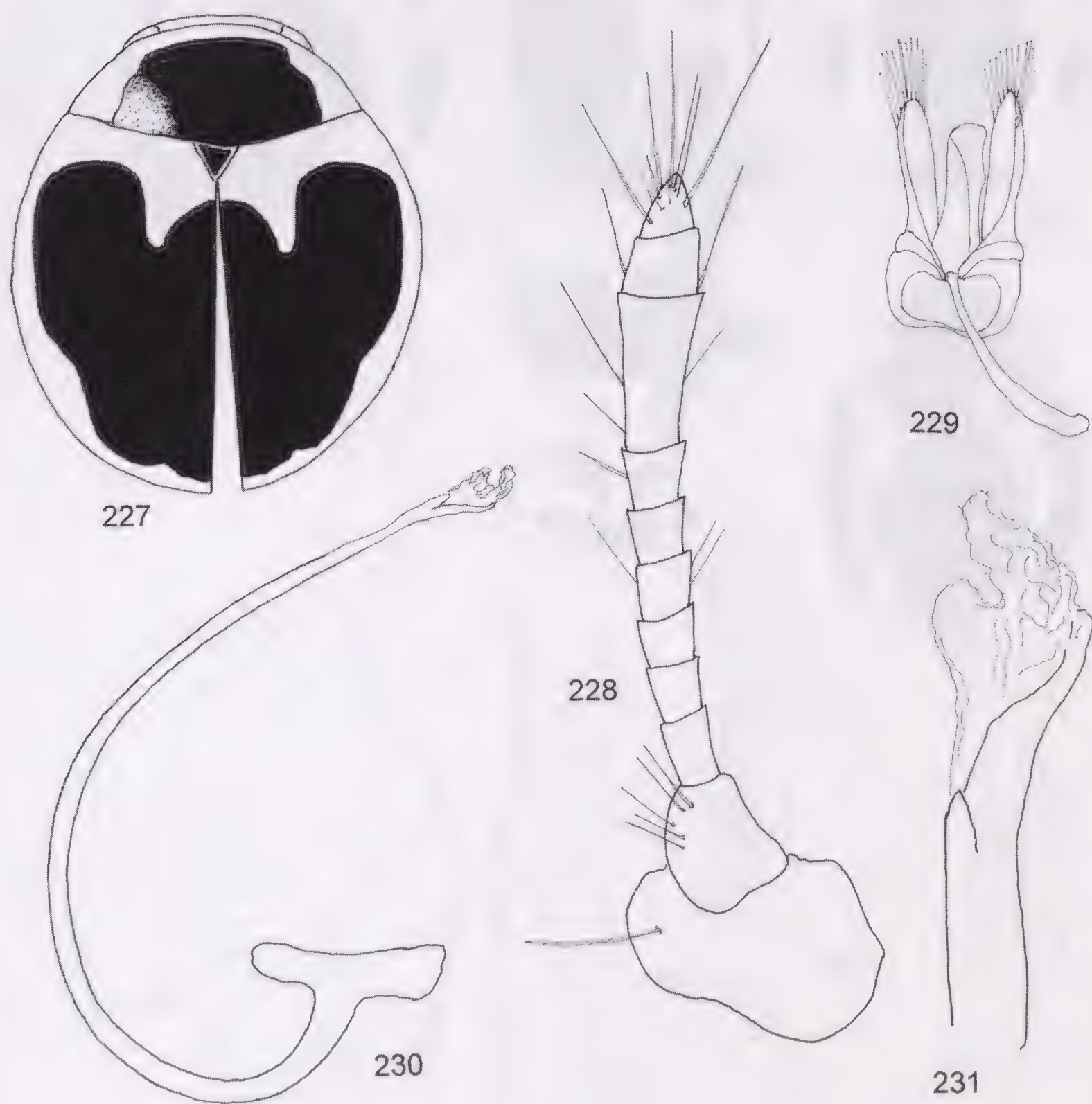
Figs. 204-212 - *Hyperaspis siladesma* and *H. octonotata* habitus and genitalia. 204-207, *H. siladesma*. 204-205, habitus. 206-207, male genitalia. 206, phallobase; 207, siphonal capsule, remainder of siphon lost. 208-212, *H. octonotata*. 208-209, habitus. 210-212, male genitalia. 210, phallobase; 211, siphon; 212, enlarged siphonal apex.



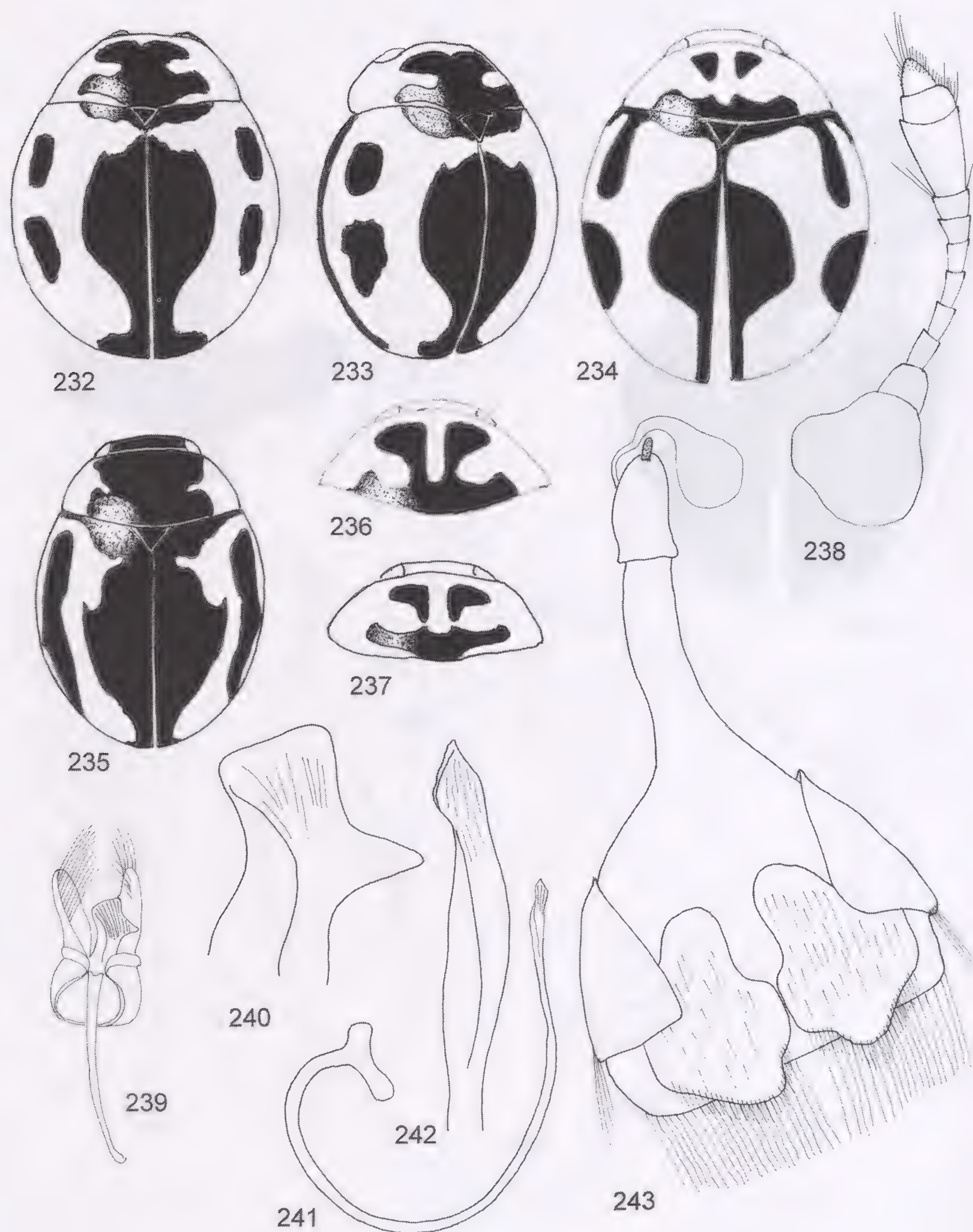
Figs. 213-220 - *Hyperaspis campbelli* and *H. colombiensis* structures. 213-215, *H. campbelli*. 213, habitus. 214-215, male genitalia. 214, phallobase; 215, siphon. 216-220, *H. colombiensis*. 216, habitus. 217, antenna. 218-220, male genitalia. 218, phallobase; 219, siphon; 220, enlarged siphonal apex.



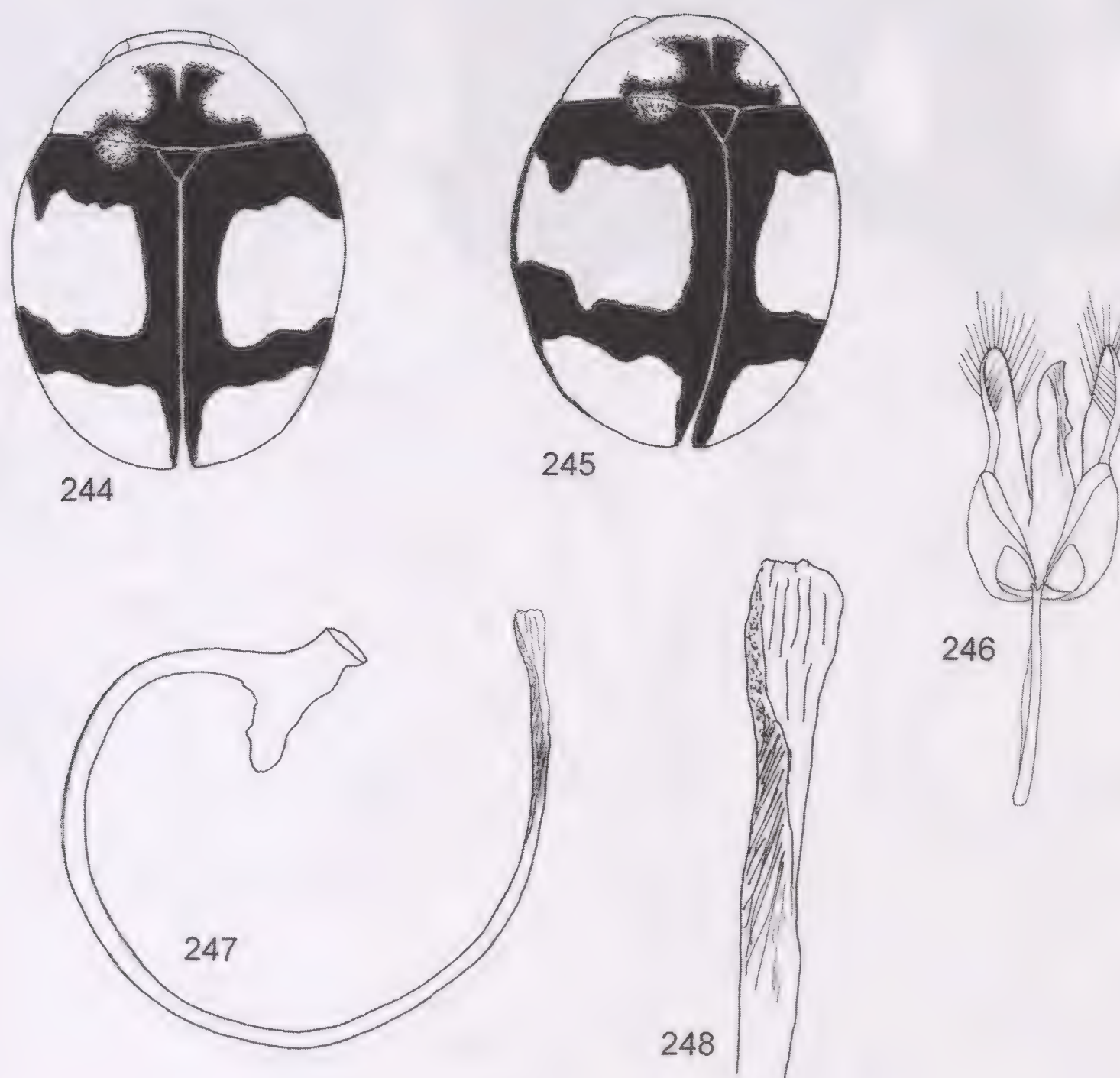
Figs. 221-226 - *Hyperaspis dissidens* structures. 221-222, habitus. 223, antenna. 224-226, male genitalia. 224, phallobase; 225, siphon; 226, enlarged siphonal apex.



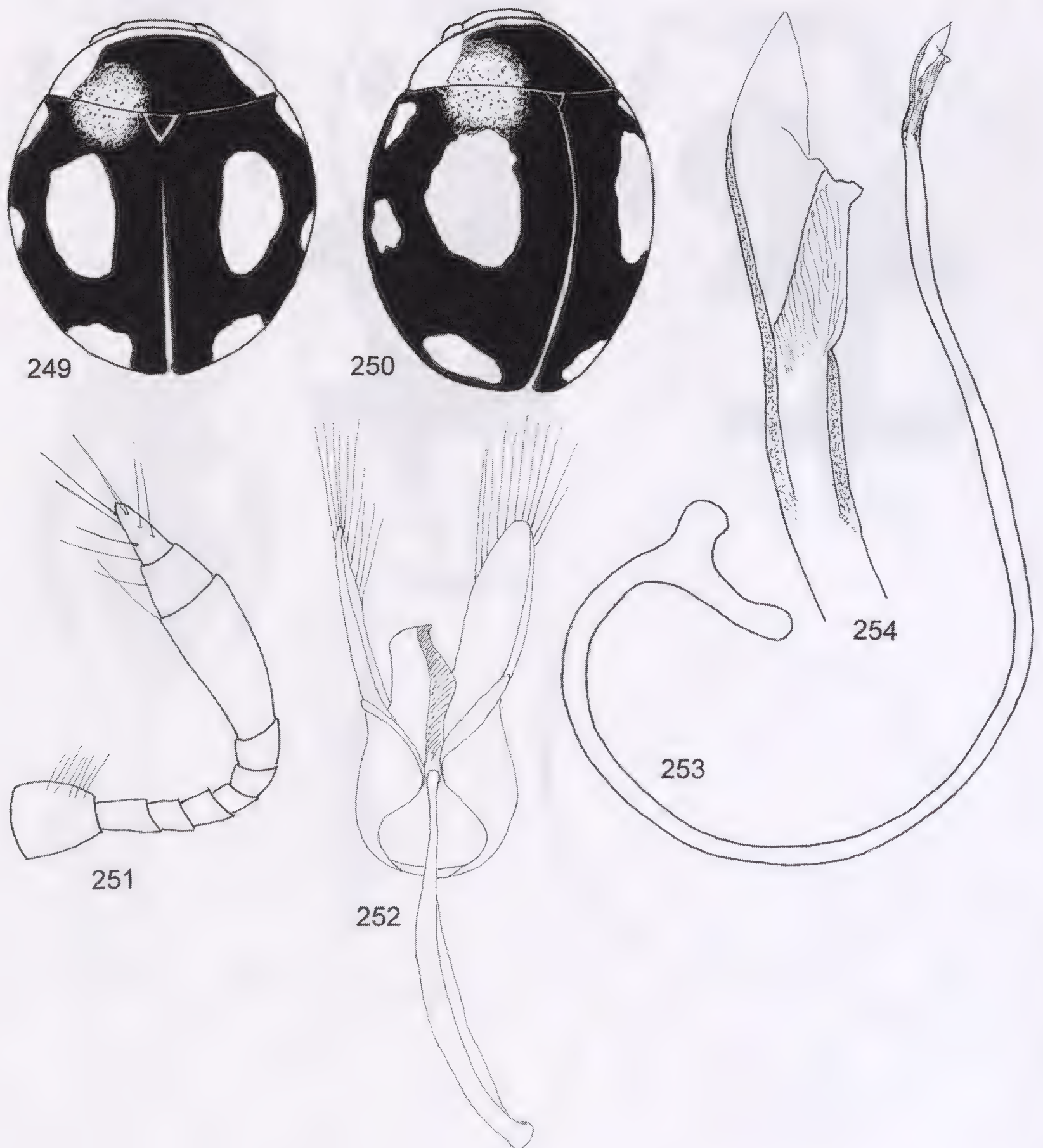
Figs. 227-231 - *Hyperaspis uninotata* structures. 227, habitus. 228, antenna. 229-231, male genitalia. 229, phallobase; 230, siphon; 231, enlarged siphonal apex.



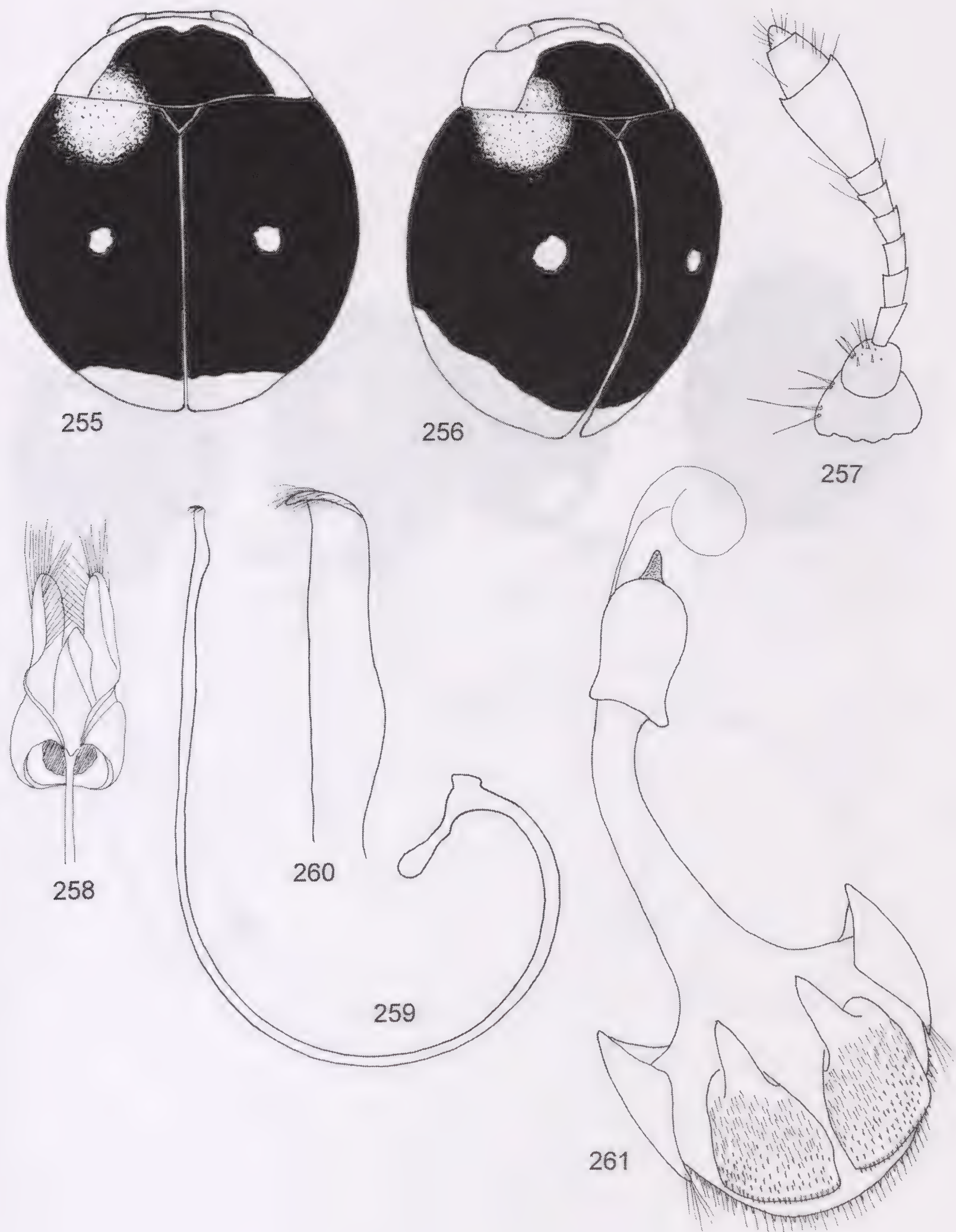
Figs. 232-243 - *Hyperaspis onerata* structures. 232-235, habitus and variations. 236-237, pronotal variations. 238, antenna. 239-242, male genitalia. 239, phallobase; 240, enlarged basal lobe; 241, siphon; 242, enlarged siphonal apex. 243, female genitalia.



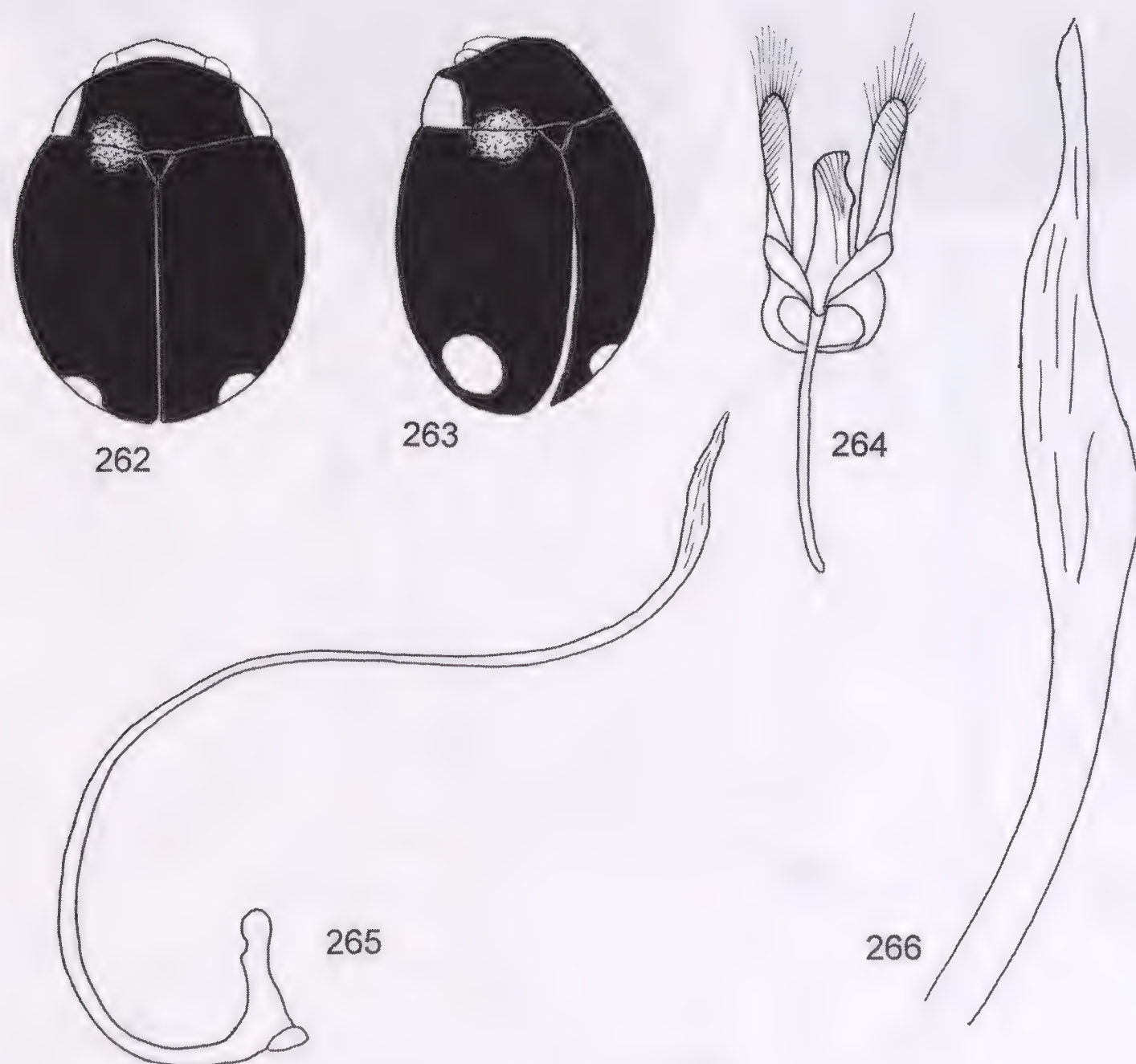
Figs. 244-248 - *Hyperaspis bicruciata* habitus and male genitalia. 244-245, habitus. 246-248, male genitalia. 246, phallobase; 247, siphus; 248, enlarged siphonal apex.



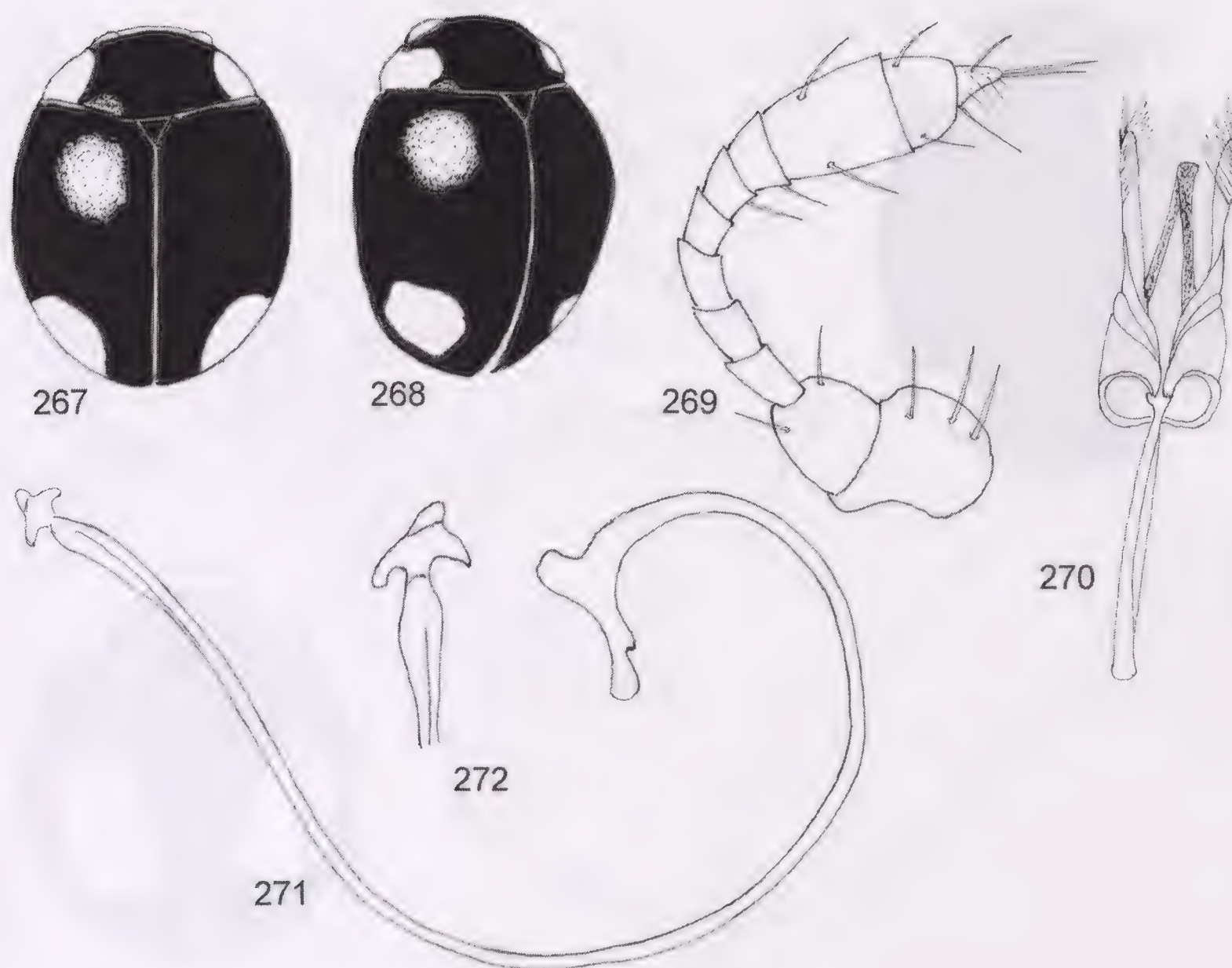
Figs. 249-254 - *Hyperaspis joannae* structures. 249-250, habitus. 251, antenna, basal article missing. 252-254, male genitalia. 252, phallobase; 253, siphon; 254, enlarged siphonal apex.



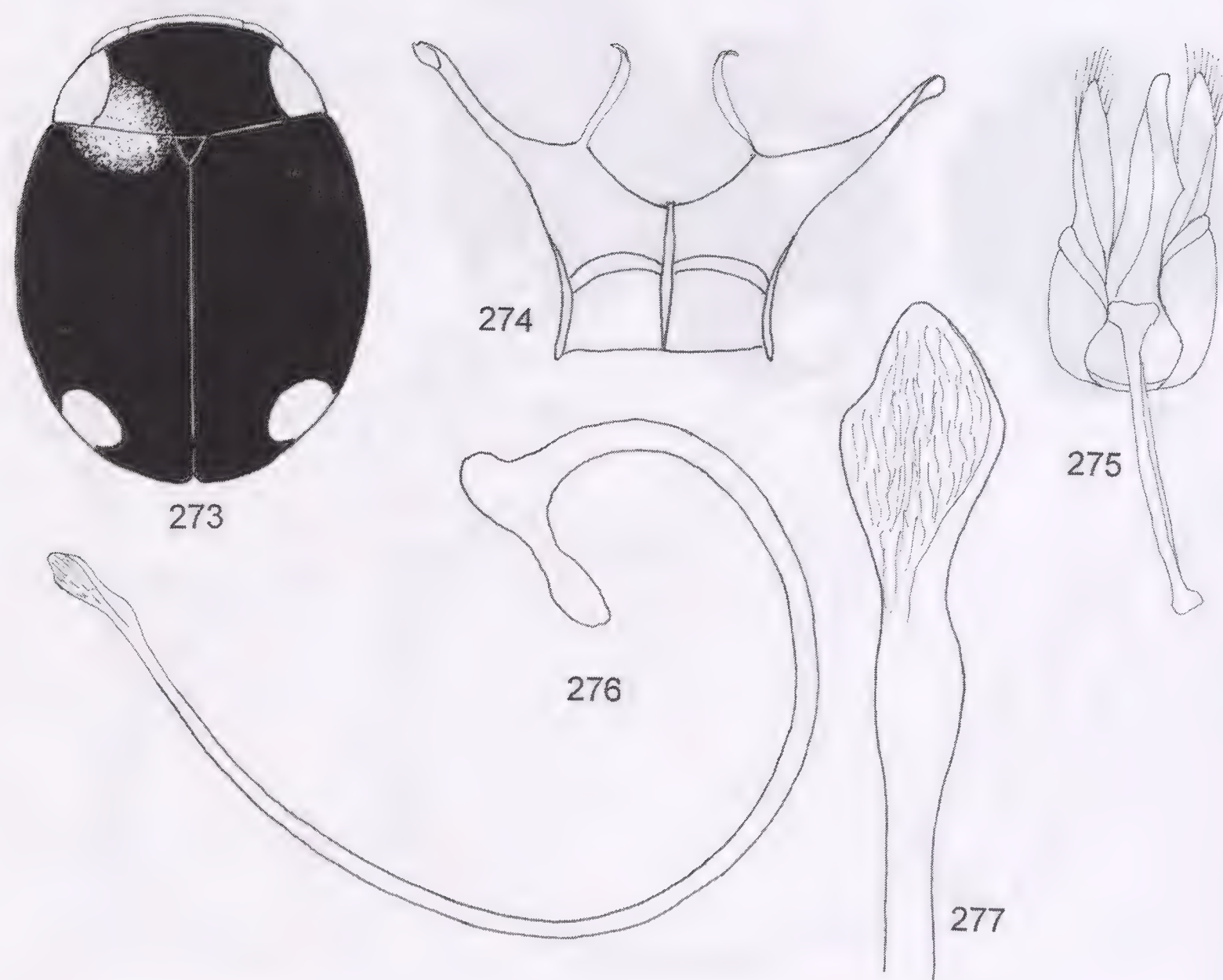
Figs. 255-261 - *Hyperaspis albopunctata* structures. 255-256, habitus. 257, antenna. 258-260, male genitalia. 258, phallobase; 259, siphon; 260, enlarged siphonal apex. 261, female genitalia.



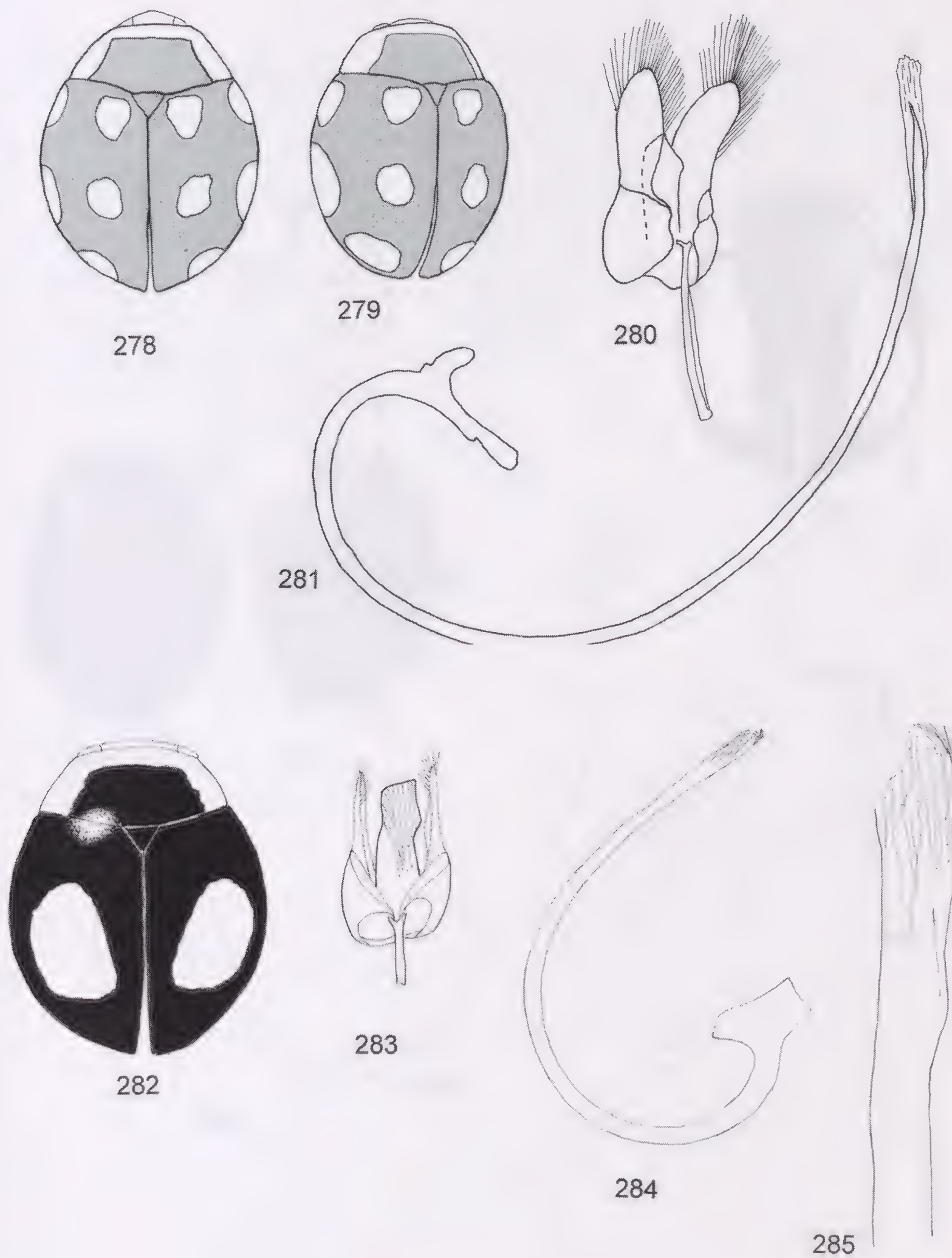
Figs. 262-266 - *Hyperaspis apicaspis* habitus and male genitalia. 262-263, habitus. 264-266, male genitalia. 264, phallobase; 265, siphon; 266, enlarged siphonal apex.



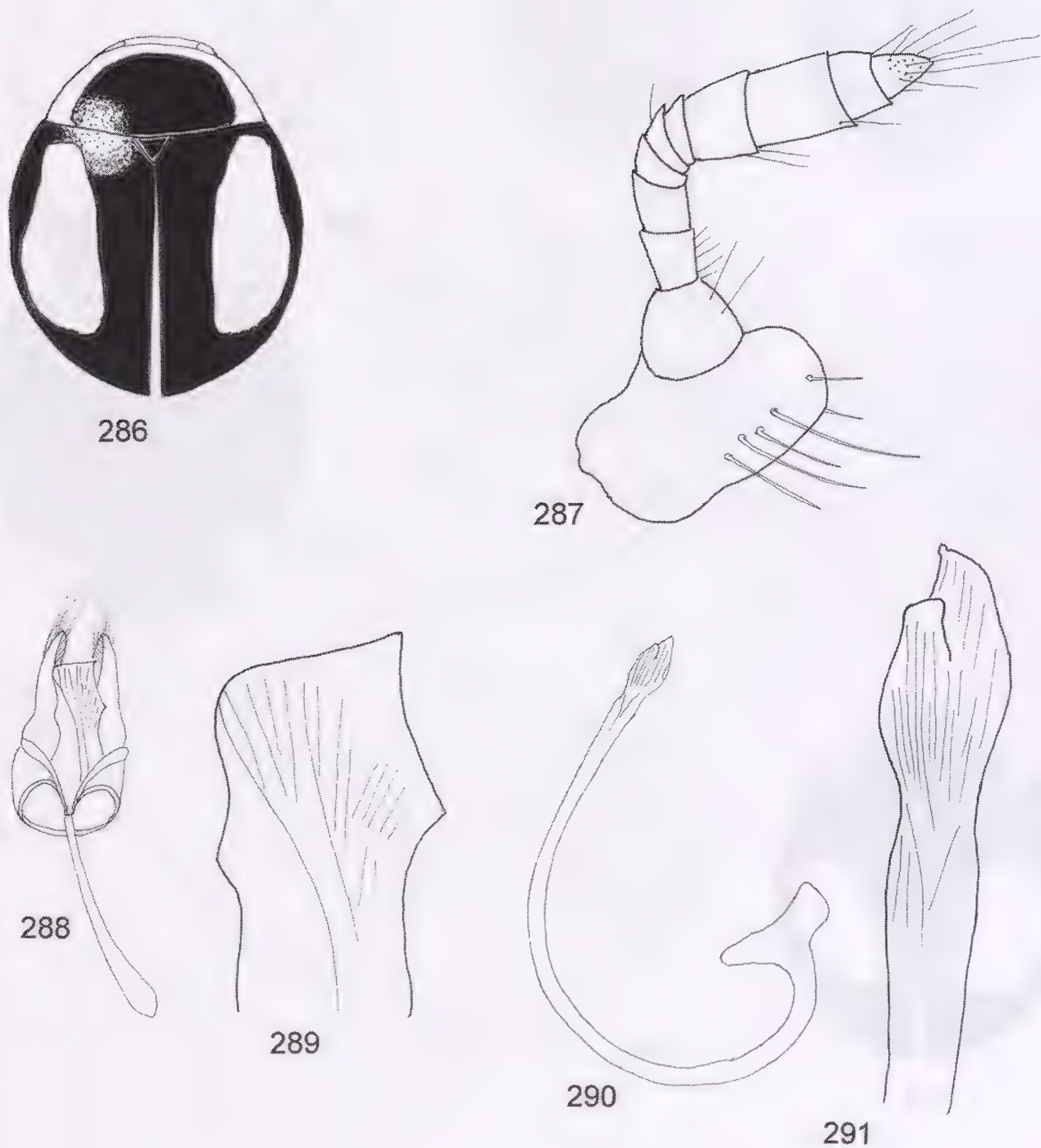
Figs. 267-272 - *Hyperaspis delicata* structures. 267-268, habitus. 269, antenna. 270-272, male genitalia. 270, phallobase; 271, siphon; 272, enlarged siphonal apex.



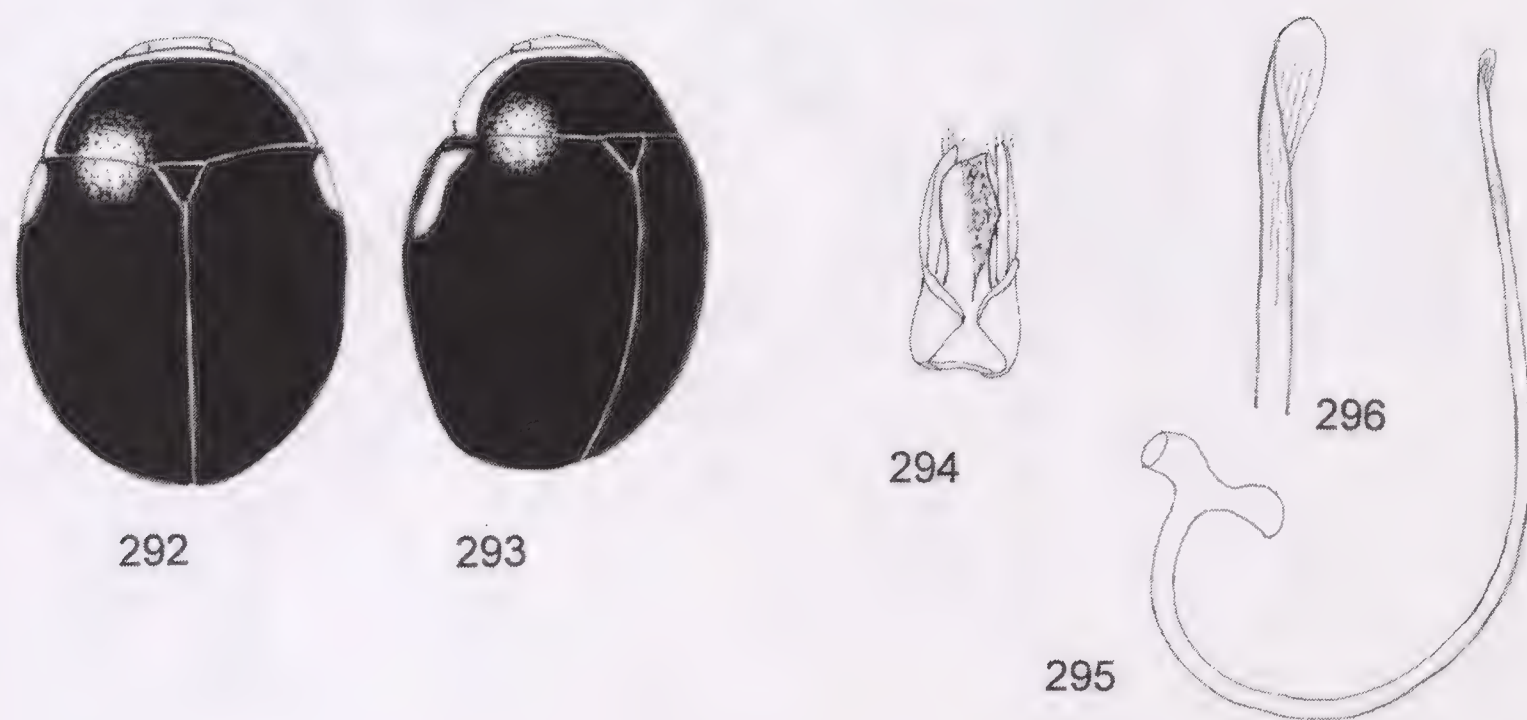
Figs. 273-277 - *Hyperaspis mimica* structures. 273, habitus. 274, metendosternite. 275-277, male genitalia. 275, phallobase; 276, siphon; 277, enlarged siphonal apex.



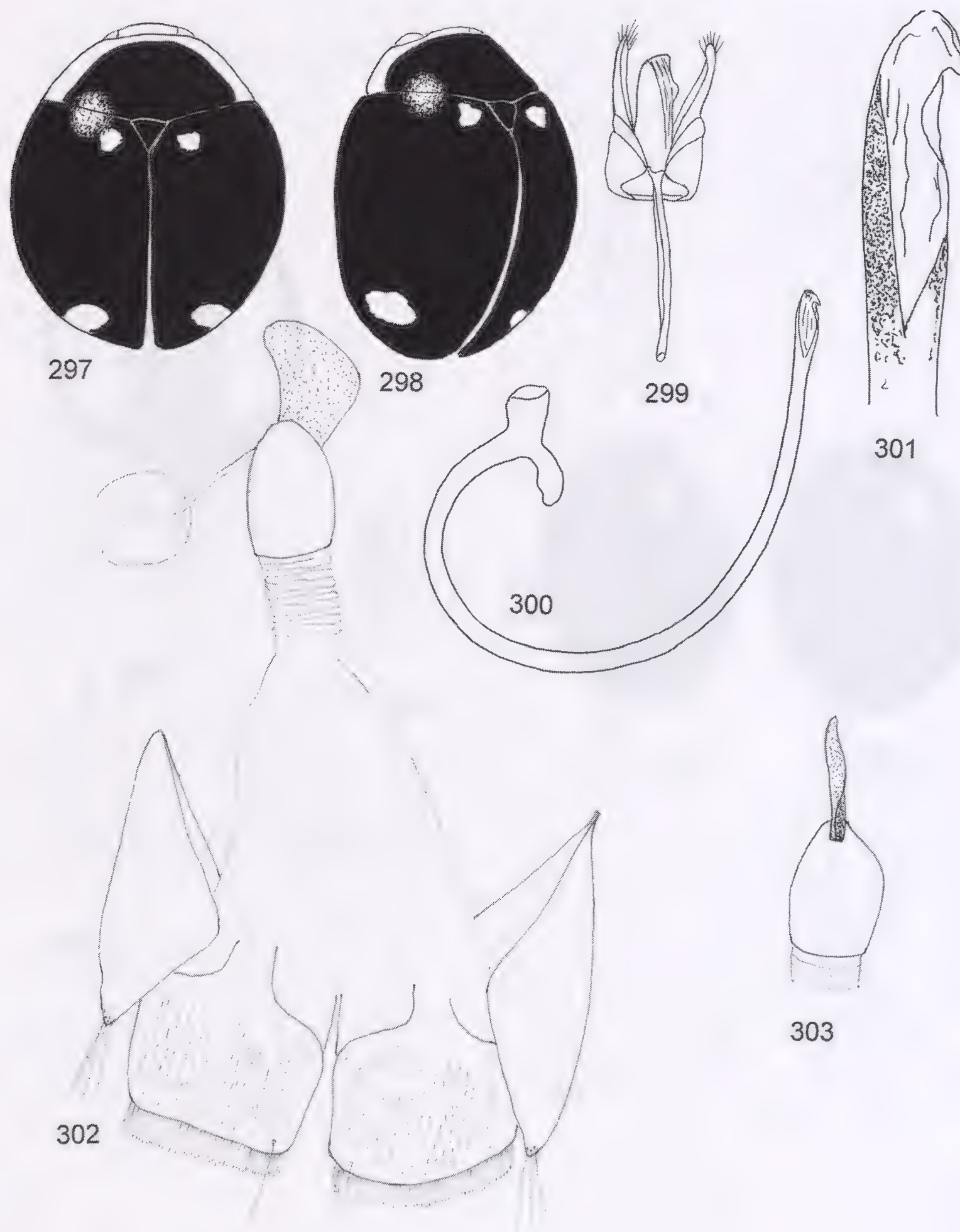
Figs. 278-285 - *Hyperaspis laterimacula* and *H. howdeni* habitus and male genitalia. 278-281, *H. laterimacula*. 278-279, habitus. 280-281, male genitalia. 280, phallobase; 281, siphon. 282-285 *H. howdeni*. 282, habitus. 283-285, male genitalia. 283, phallobase; 284, siphon; 285, enlarged siphonal apex.



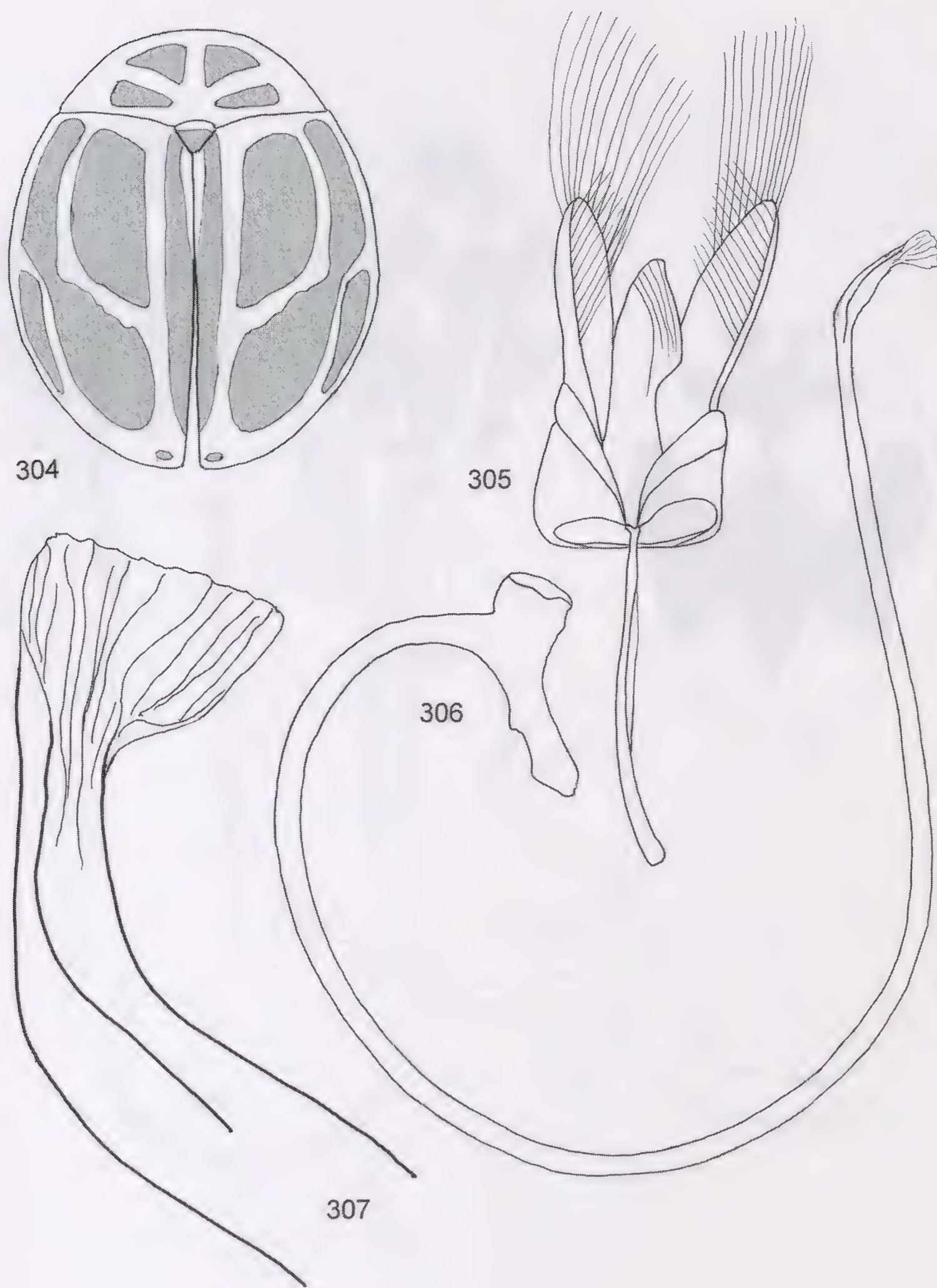
Figs. 286-291 - *Hyperaspis chocoi* structures. 286, habitus. 287, antenna. 288-291, male genitalia. 288, phallobase; 289, enlarged basal lobe; 290, siphon; 291, enlarged siphonal apex.



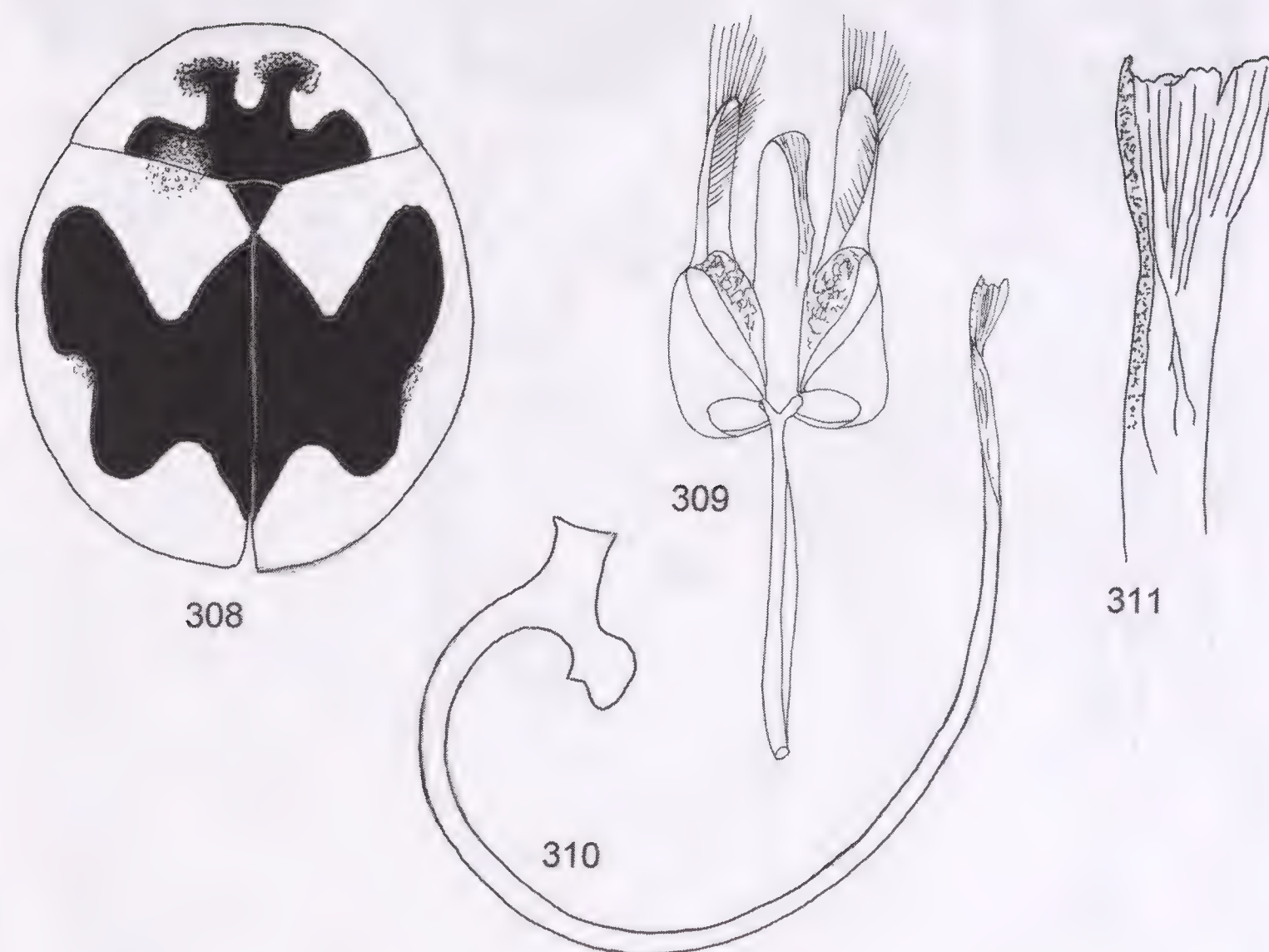
Figs. 292-296 - *Hyperaspis atra* habitus and male genitalia. 292-293, habitus. 294-296, male genitalia. 294, phallobase; 295, siphon; 296, enlarged siphonal apex.



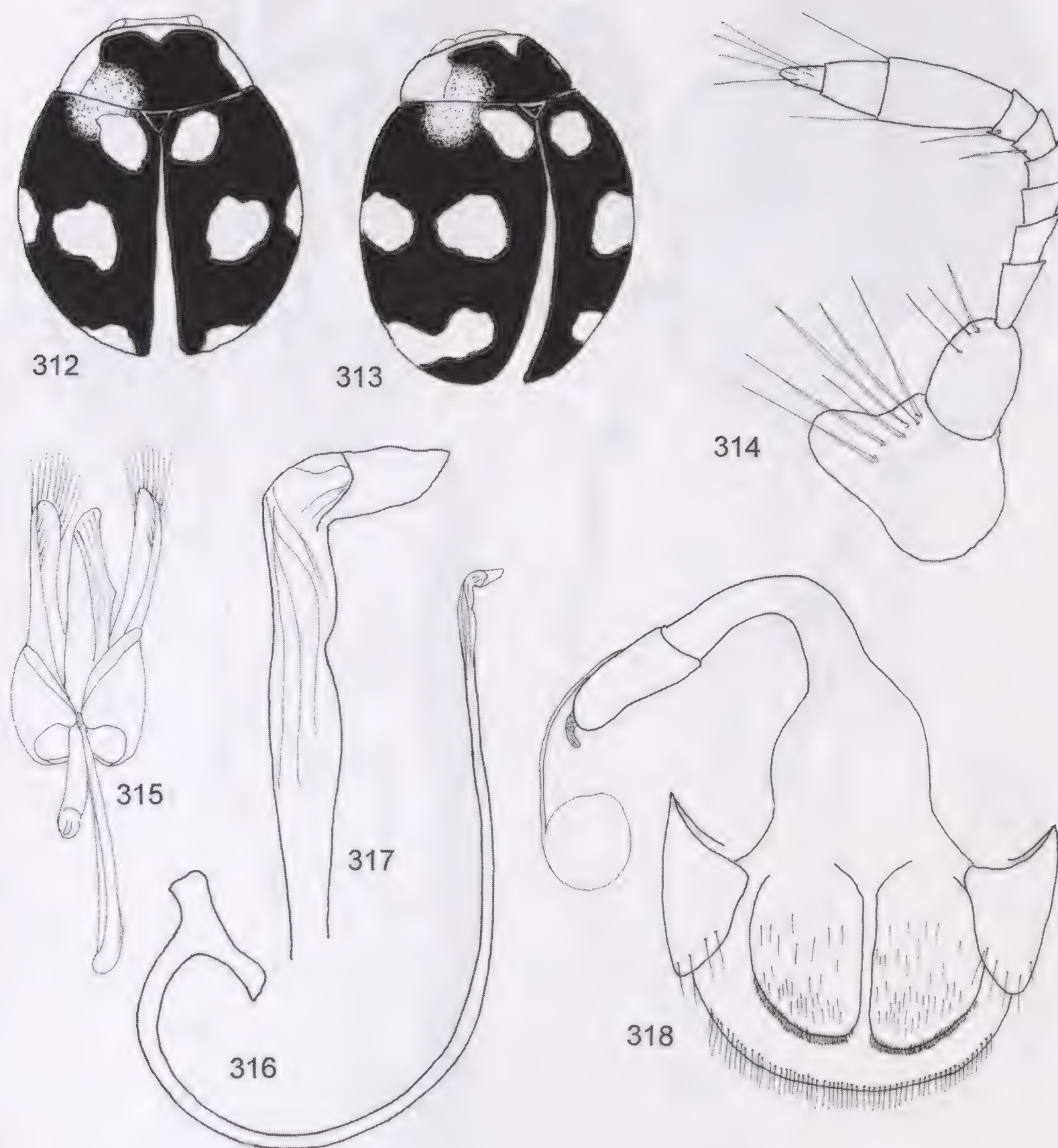
Figs. 297-303 - *Hyperaspis recordata* habitus and genitalia. 297-298, habitus. 299-301, male genitalia. 299, phallobase; 300, siphon; 301, enlarged siphonal apex. 302-303, female genitalia. 302, complete genitalia; 303, basal unit, ventral view.



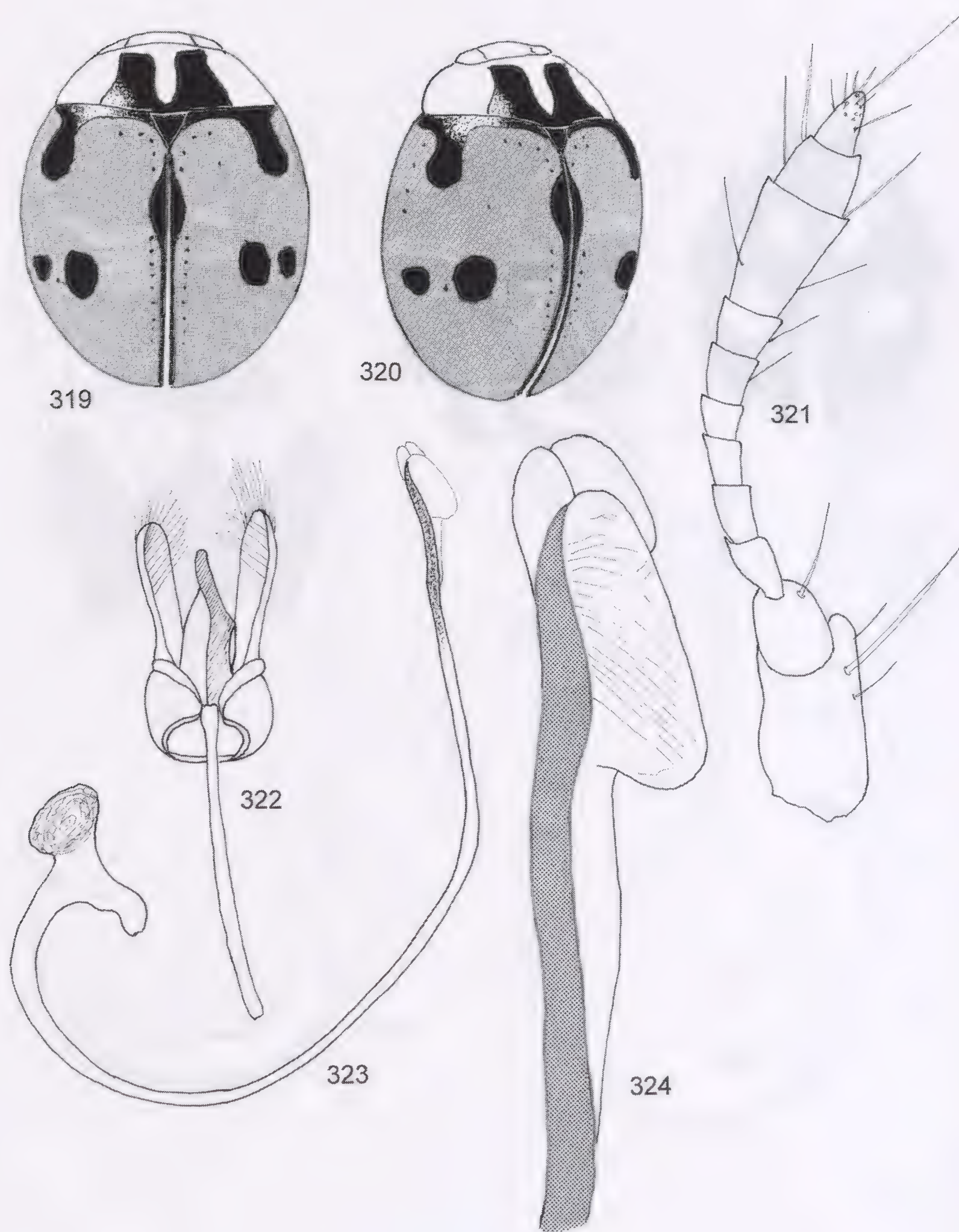
Figs. 304-307 - *Hyperaspis eupaleoides* habitus and male genitalia. 304, habitus. 305-307, male genitalia. 305, phallobase; 306, siphon; 307, enlarged siphonal apex.



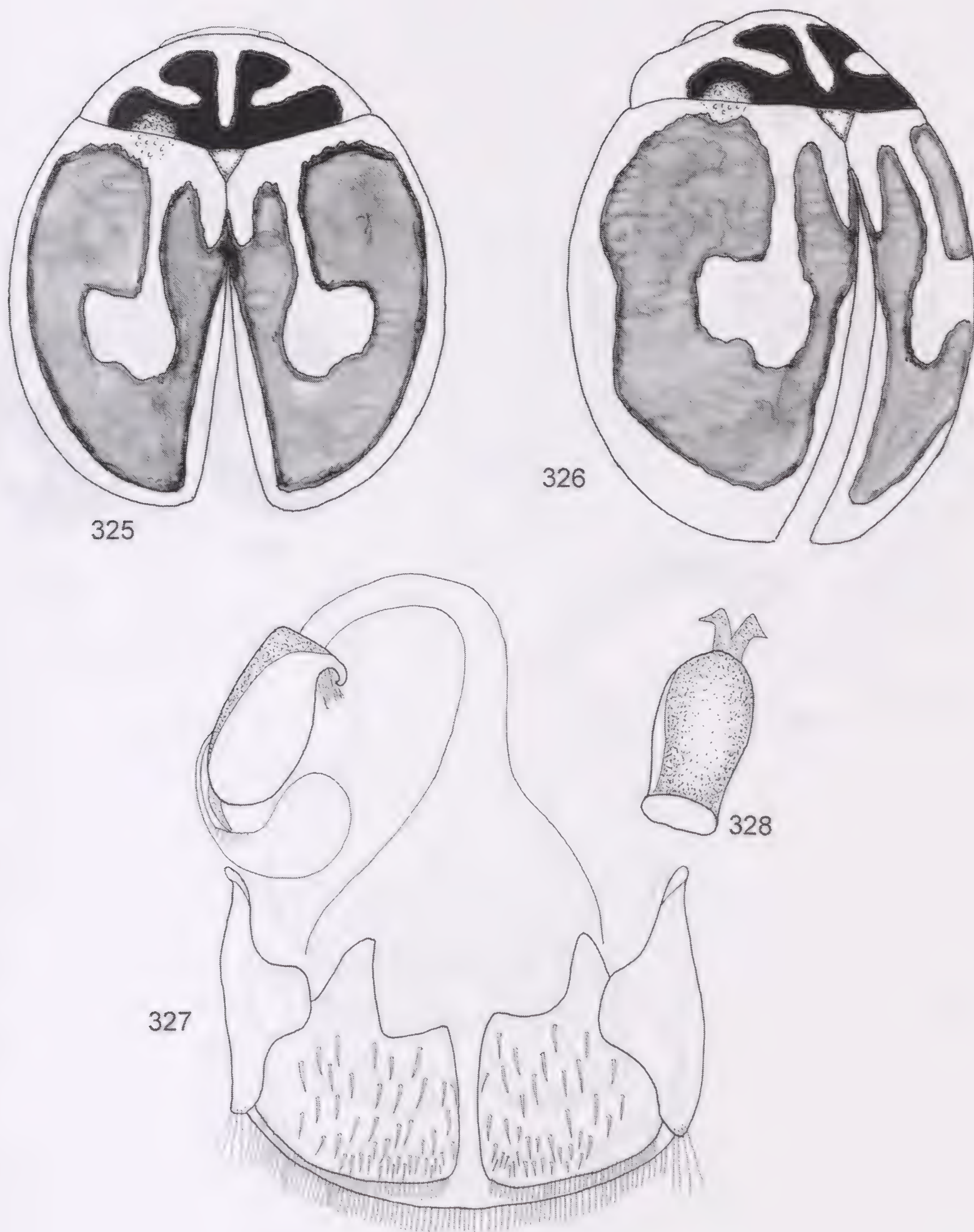
Figs. 308-311 - *Hyperaspis mariposa* habitus and male genitalia. 308, habitus. 309-311, male genitalia. 309, phallobase; 310, siphon; 311, enlarged siphonal apex.



Figs. 312-318 - *Hyperaspis simlaensis* structures. 312-313, habitus. 314, antenna. 315-317, male genitalia. 315, phallobase; 316, siphon; 317, enlarged siphonal apex. 318, female genitalia.



Figs. 319-324 - *Hyperaspis lindae* structures. 319-320, habitus. 321, antenna. 322-324, male genitalia. 322-phallobase; 323, siphon; 324, enlarged siphonal apex.



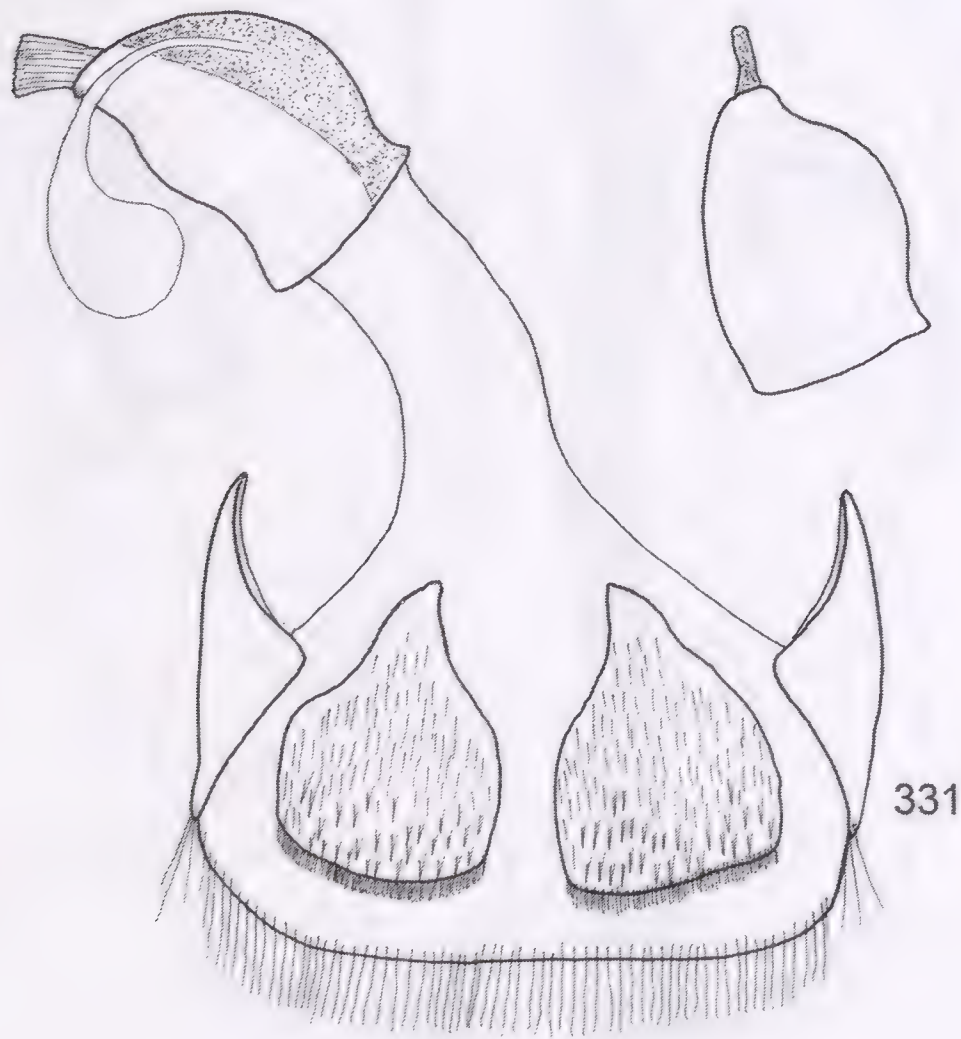
Figs. 325-328 - *Hyperaspis c-nigrum* habitus and female genitalia. 325-326, habitus. 327-328, female genitalia. 327, complete genitalia; 328, lateral view of basal unit.



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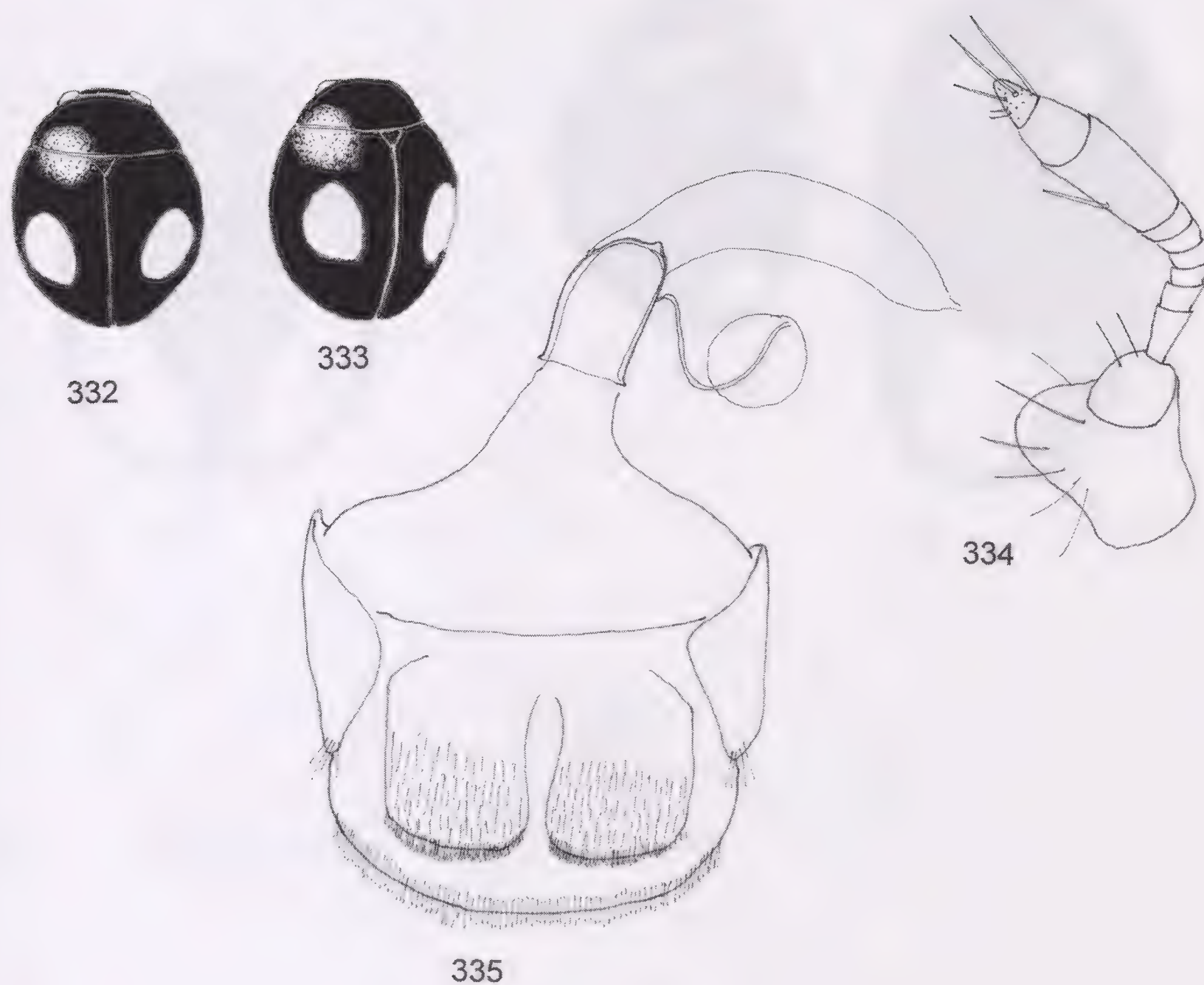


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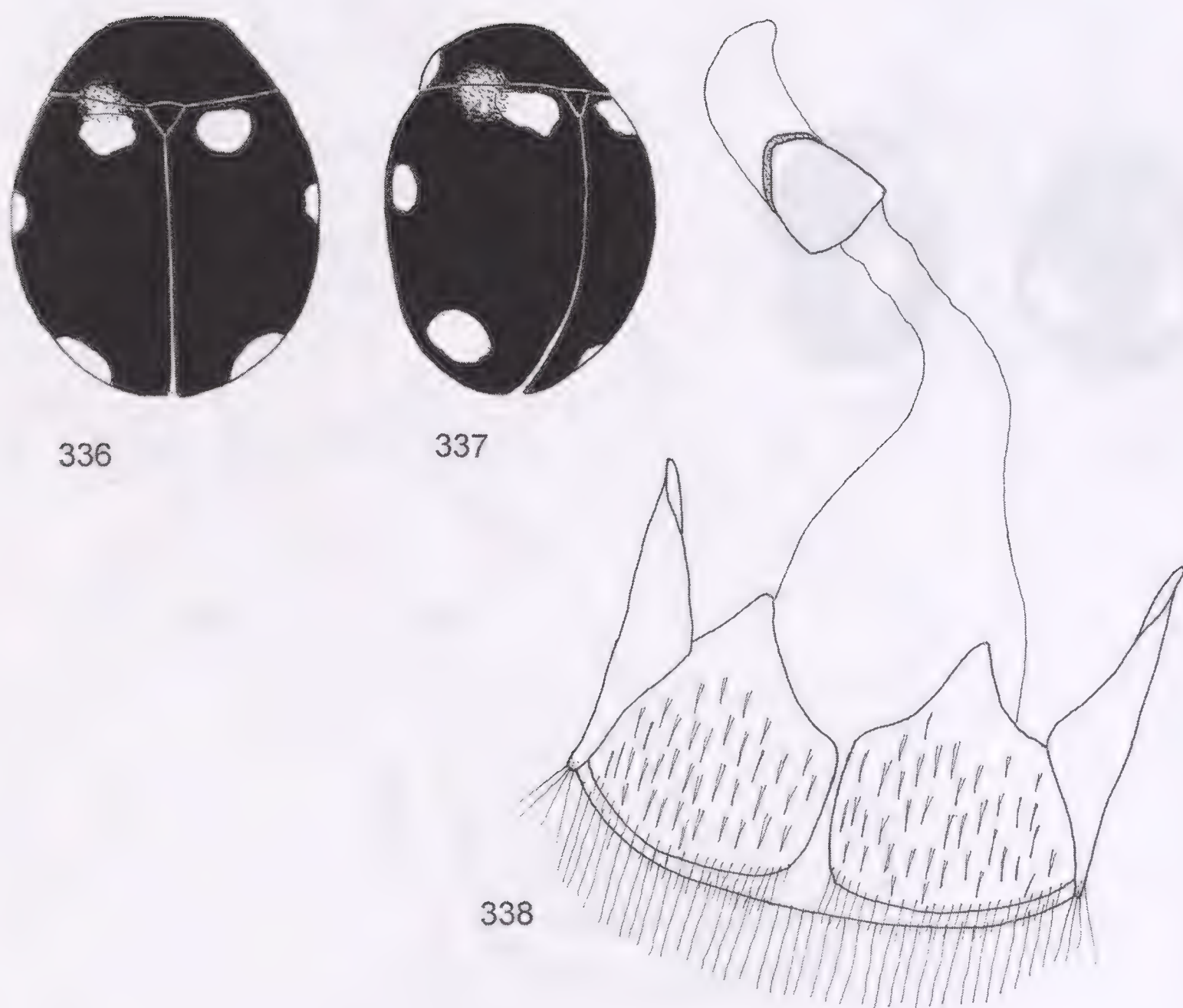


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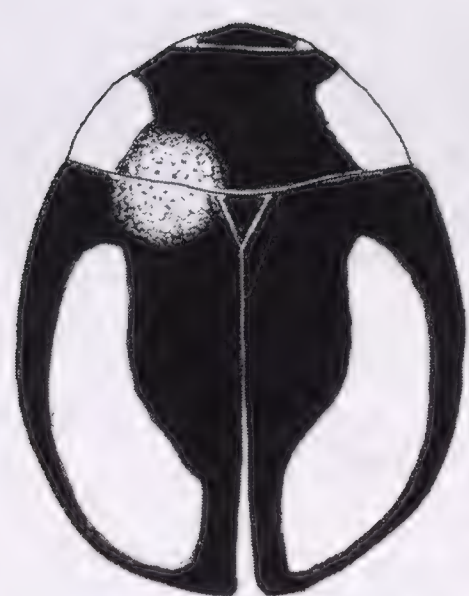
Figs. 329-331 - *Hyperaspis sagittata* habitus and female genitalia. 329-330, habitus. 331, complete female genitalia and ventral view of basal unit.



Figs. 332-325 - *Hyperaspis guilloryi* structures. 332-333, habitus. 334, antenna. 335, female genitalia.



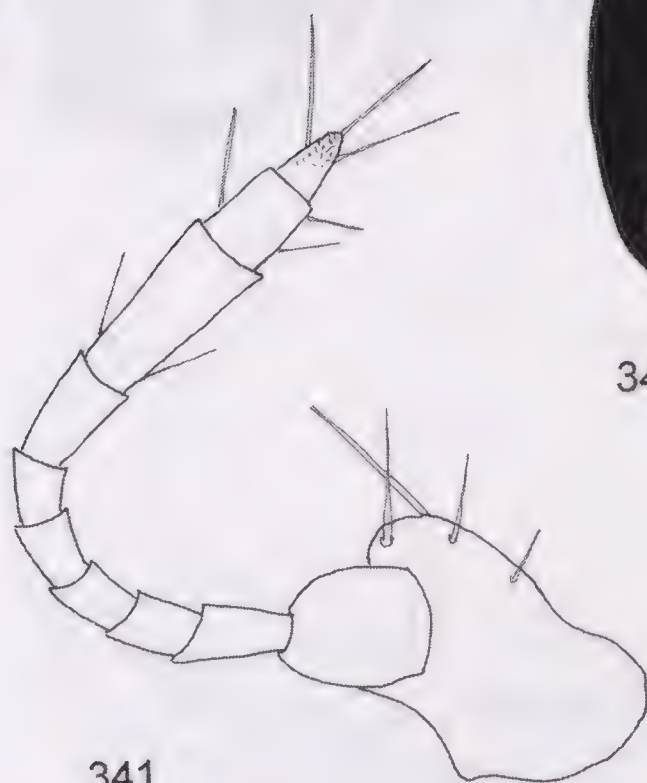
Figs. 336-338 - *Hyperaspis pseudopavida* habitus and female genitalia.
336-337, habitus. 338, female genitalia.



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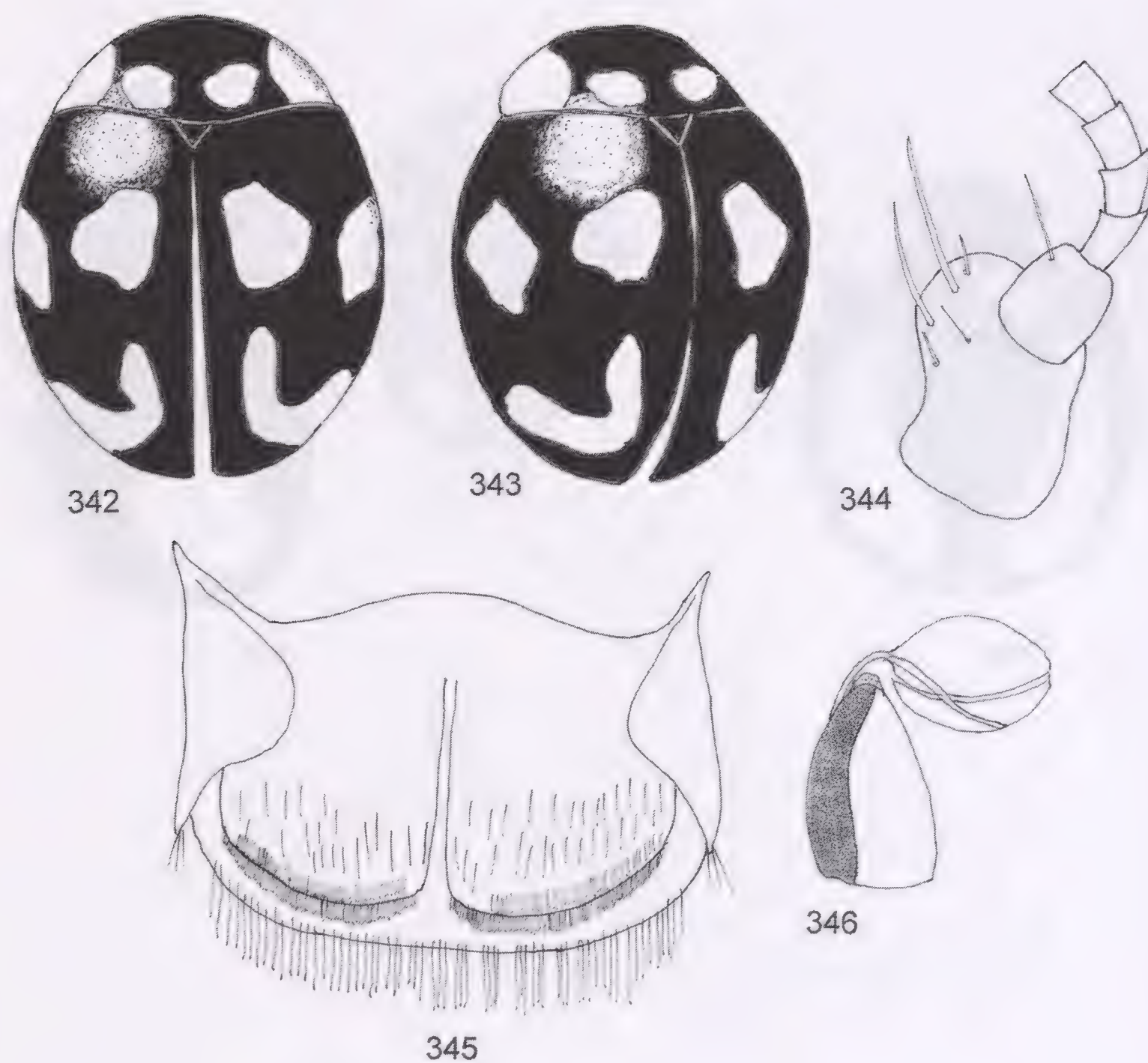


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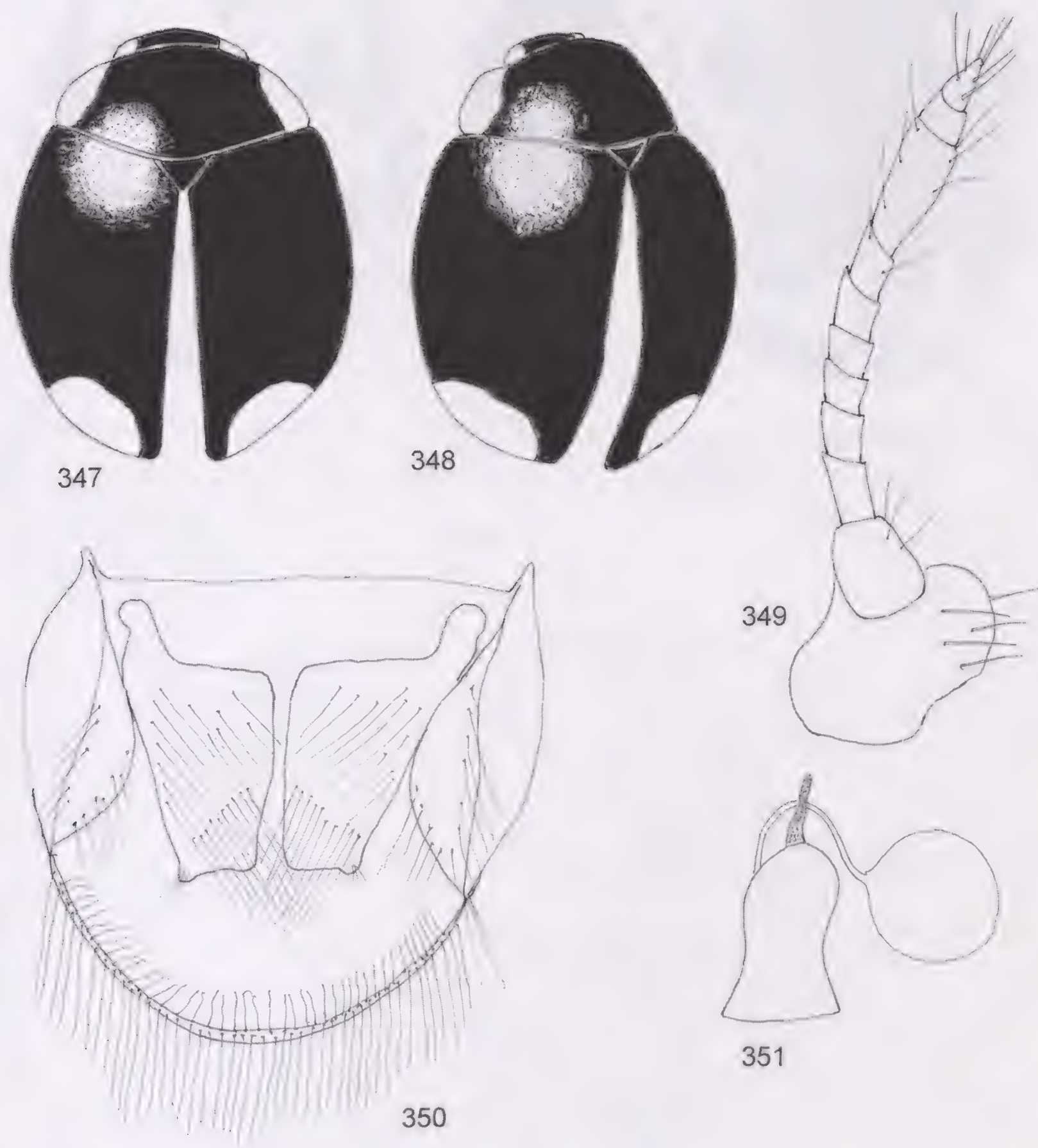


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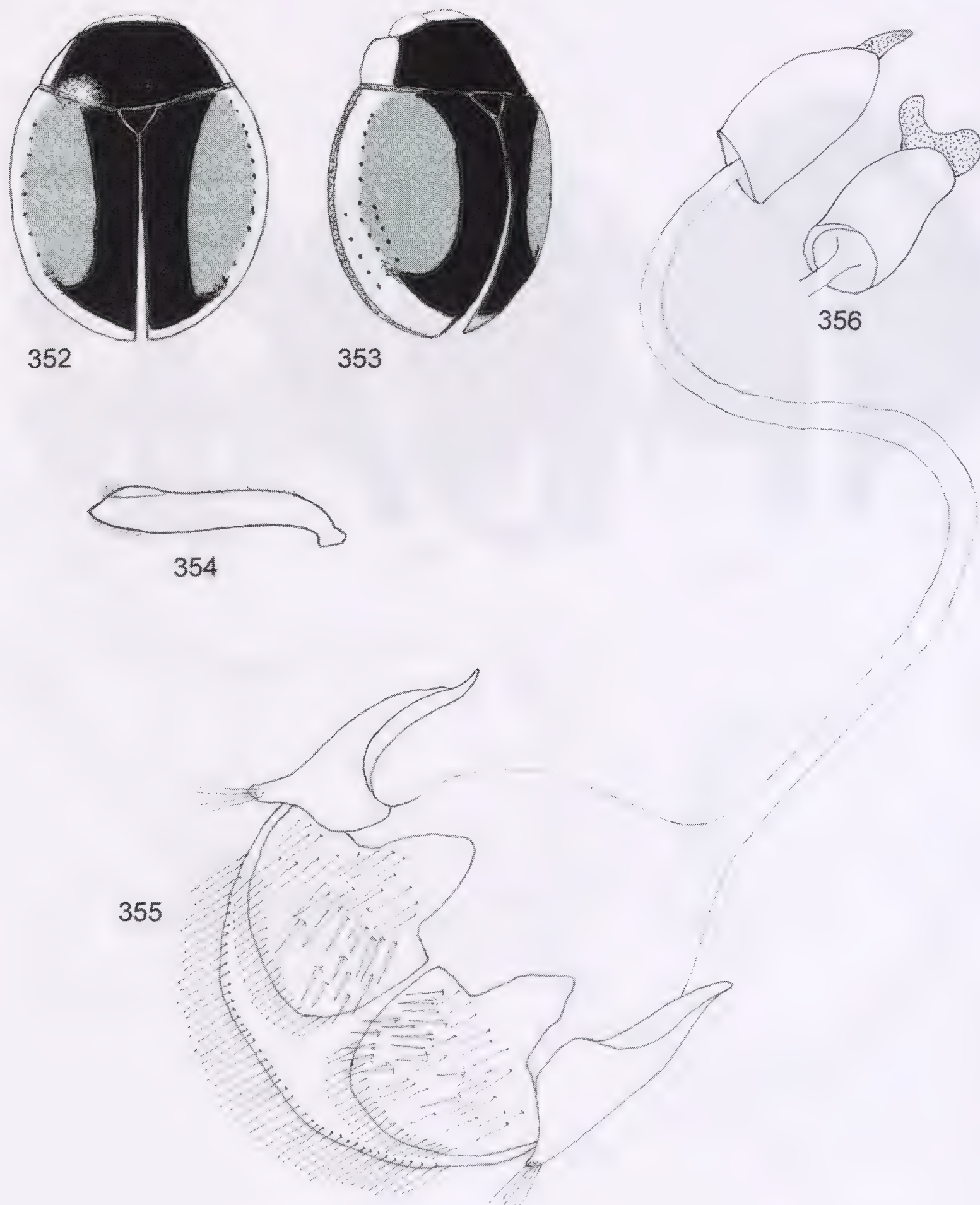
Figs. 339-341 - *Hyperaspis istmina* habitus and antenna. 339-340, habitus.
341, antenna.



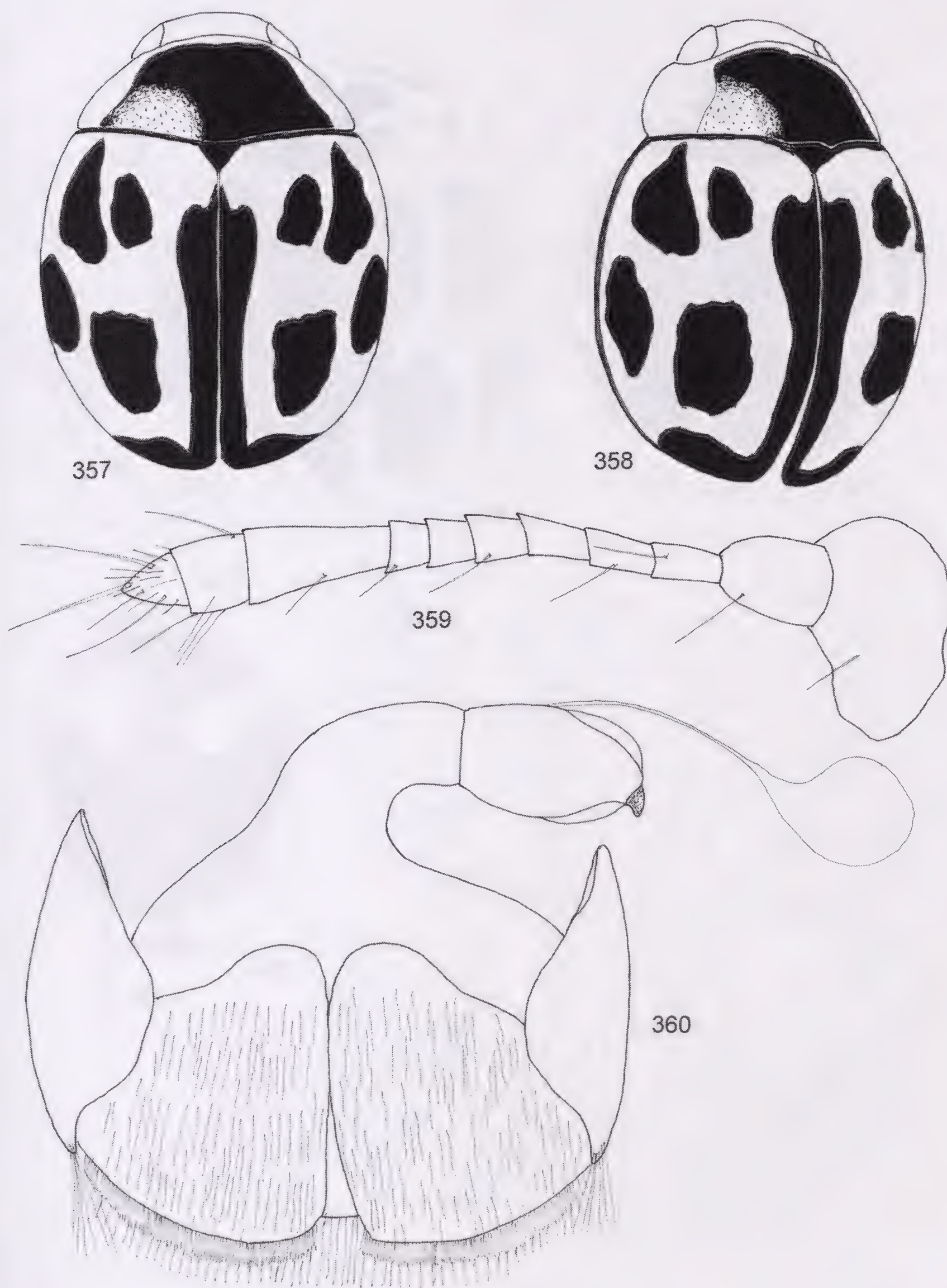
Figs. 342-346 - *Hyperaspis satipoensis* structures. 342-343, habitus. 344, antenna, last 5 articles missing. 345-346, female genitalia. 345, genital plates; 346, basal and distal portions.



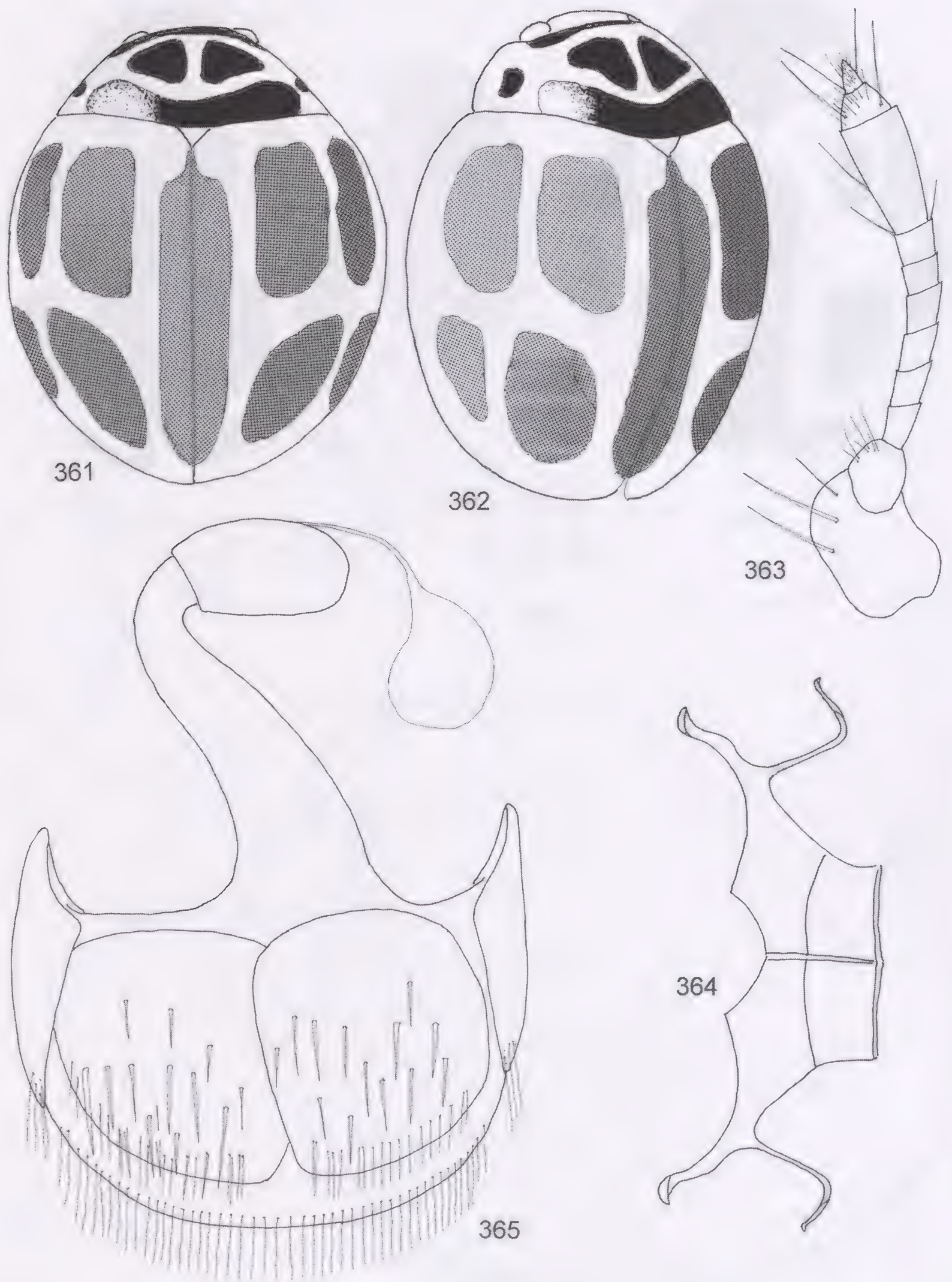
Figs. 347-351 - *Hyperaspis abertha* structures. 347-348, habitus. 349, antenna. 350-351, female genitalia. 350, genital plates; 351, basal and distal portions.



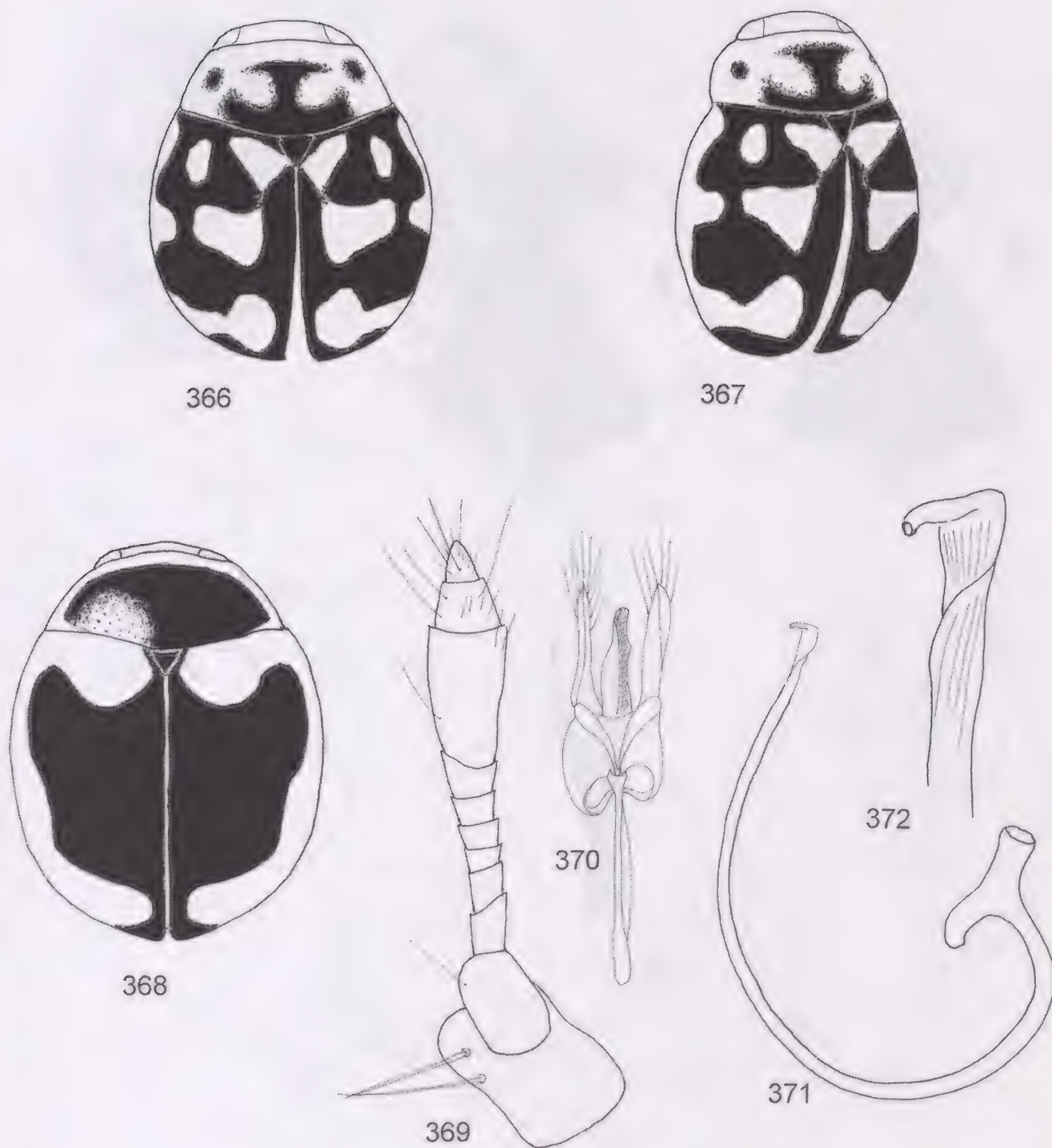
Figs. 352-356 - *Hyperaspis circumclusa* structures. 352-353, habitus. 354, protibia. 355-356, female genitalia. 355, complete genitalia with basal unit in ventral view; 356, lateral view of basal unit.



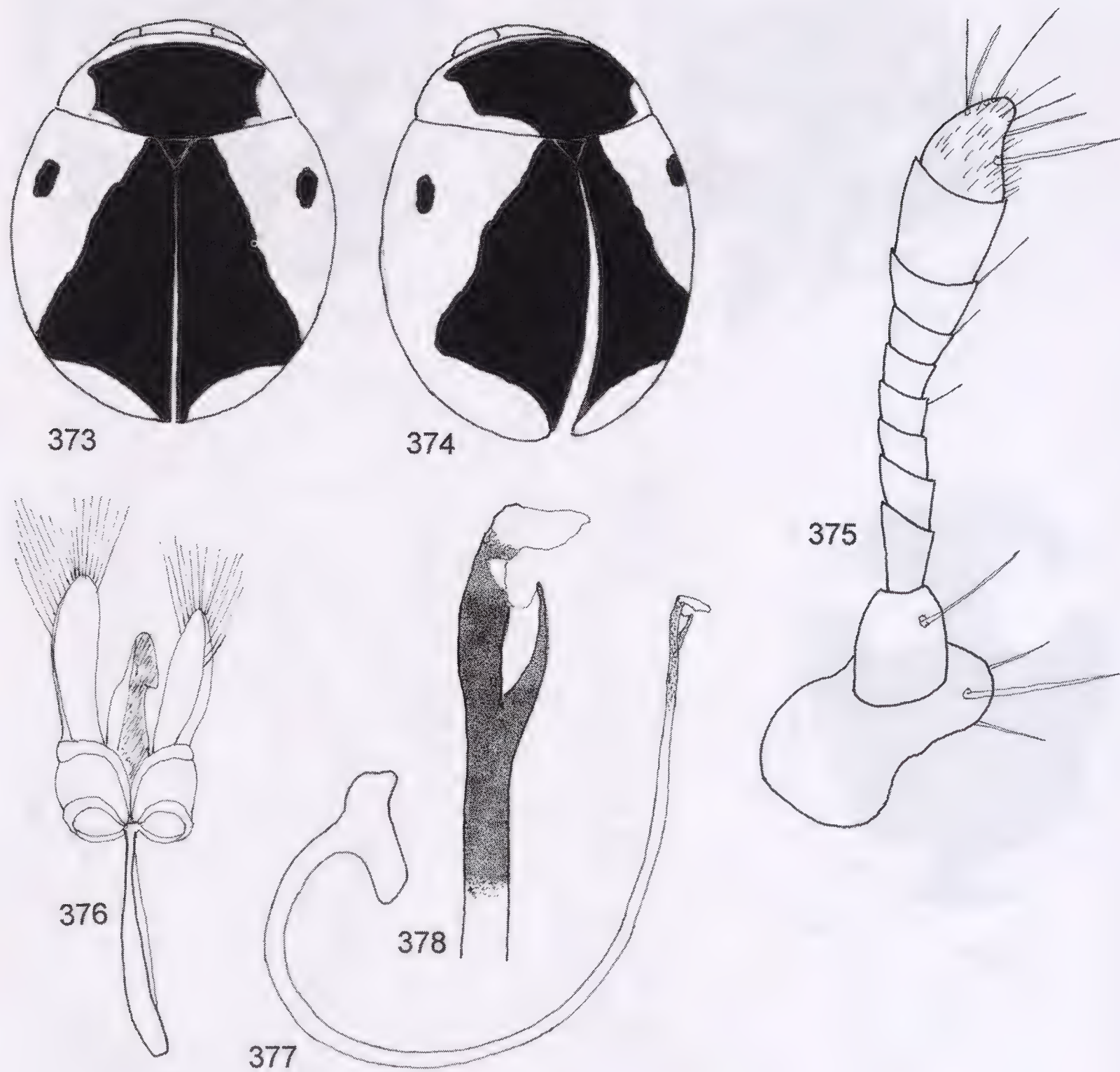
Figs. 357-360 - *Hyperaspis aemulata* structures. 357-358, habitus. 359, antenna. 360, female genitalia.



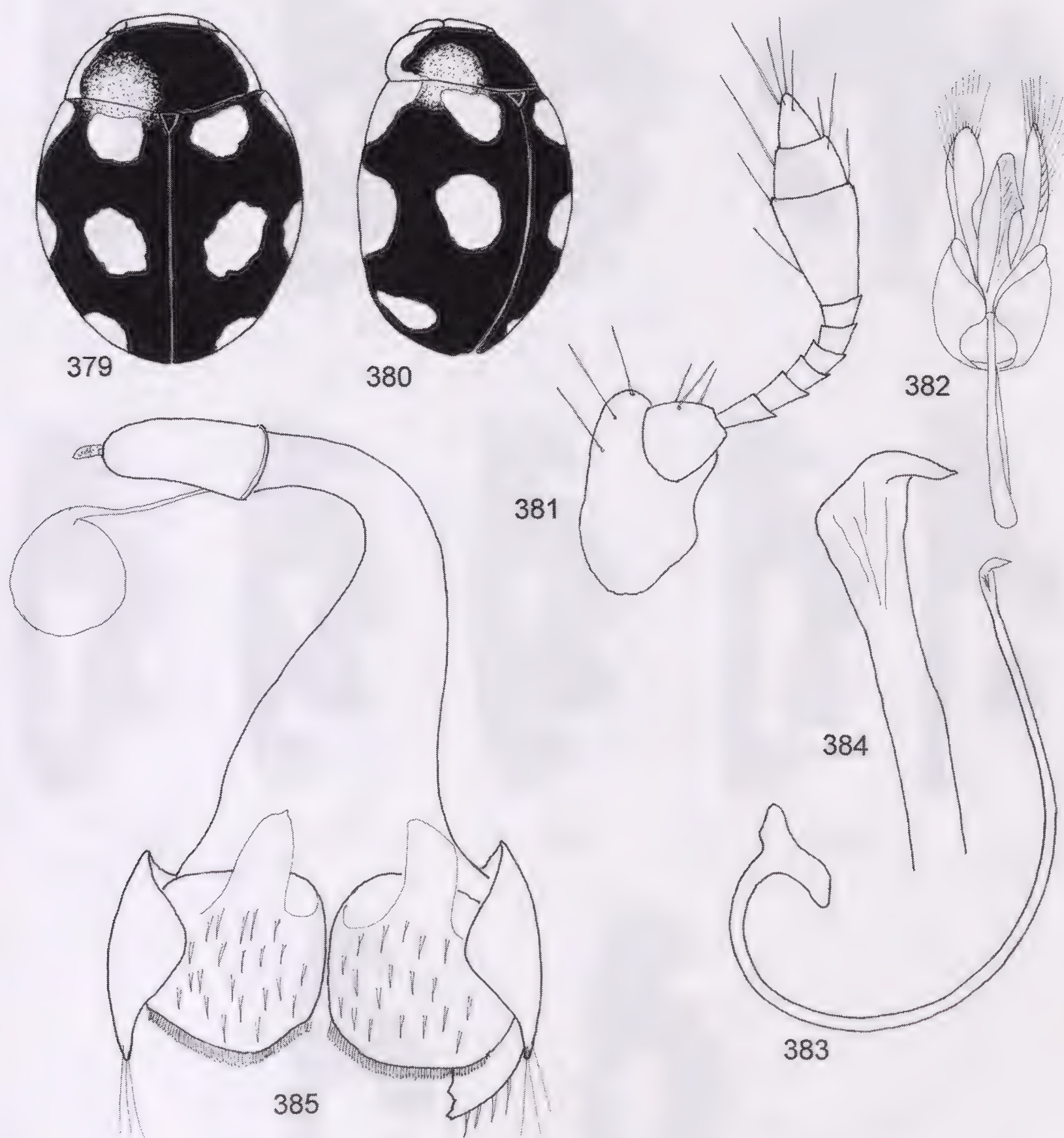
Figs. 361-365 - *Hyperaspis dispar* structures. 361-362, habitus. 363, antenna. 364, metendosternite. 365, female genitalia.



Figs. 366-372 - *Hyperaspis histrionica* and *H. ayacucho* habitus and structures. 366-367, *H. histrionica* habitus. 368-372, *H. ayacucho* structures. 368, habitus. 369, antenna. 370-372, male genitalia. 370, phallobase; 371, siphon; 372, enlarged siphonal apex.



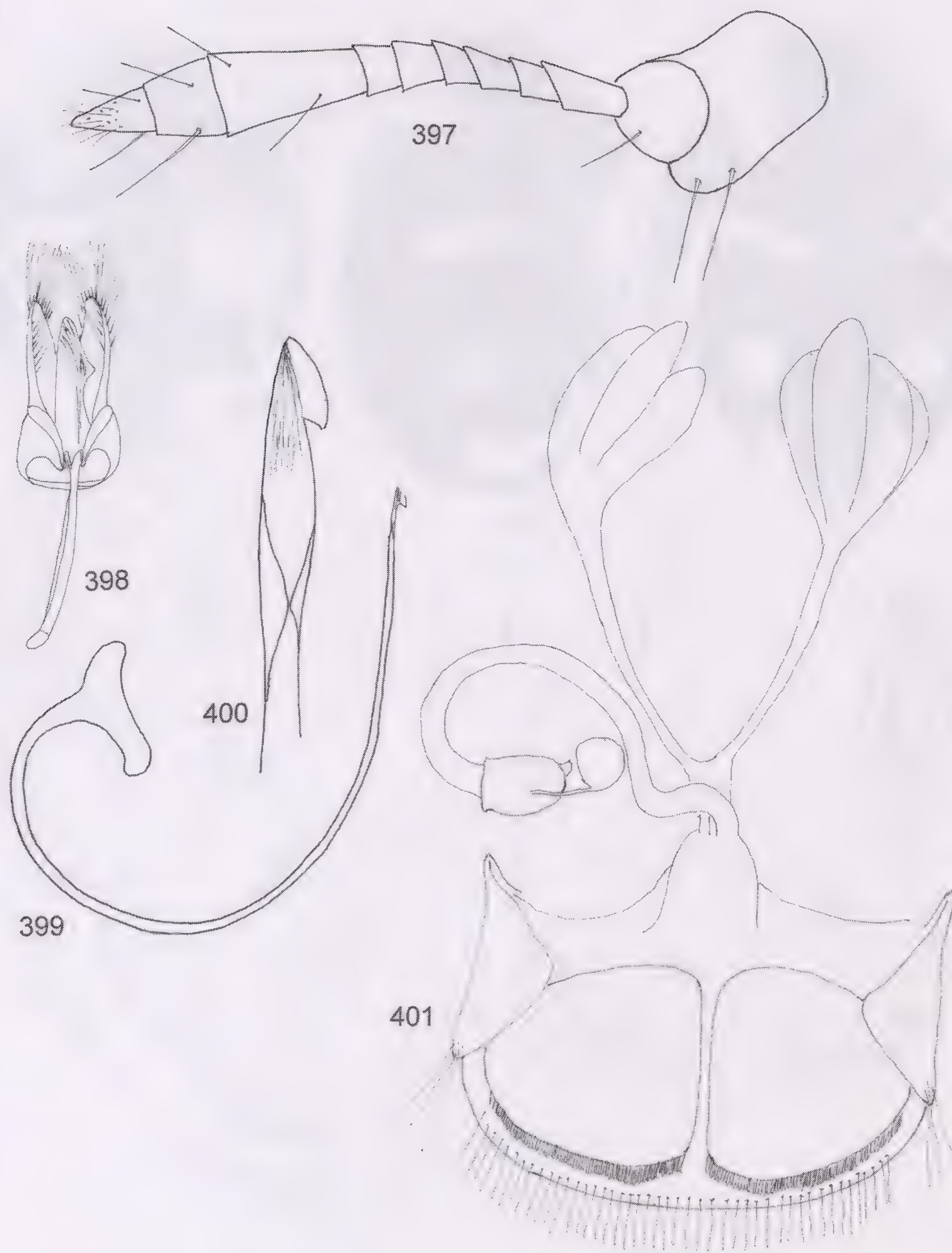
Figs. 373-378 - *Hyperaspis herrerae* structures. 373-374, habitus. 375, antenna. 376-378, male genitalia. 376, phallobase; 377, siphon; 378, enlarged siphonal apex.



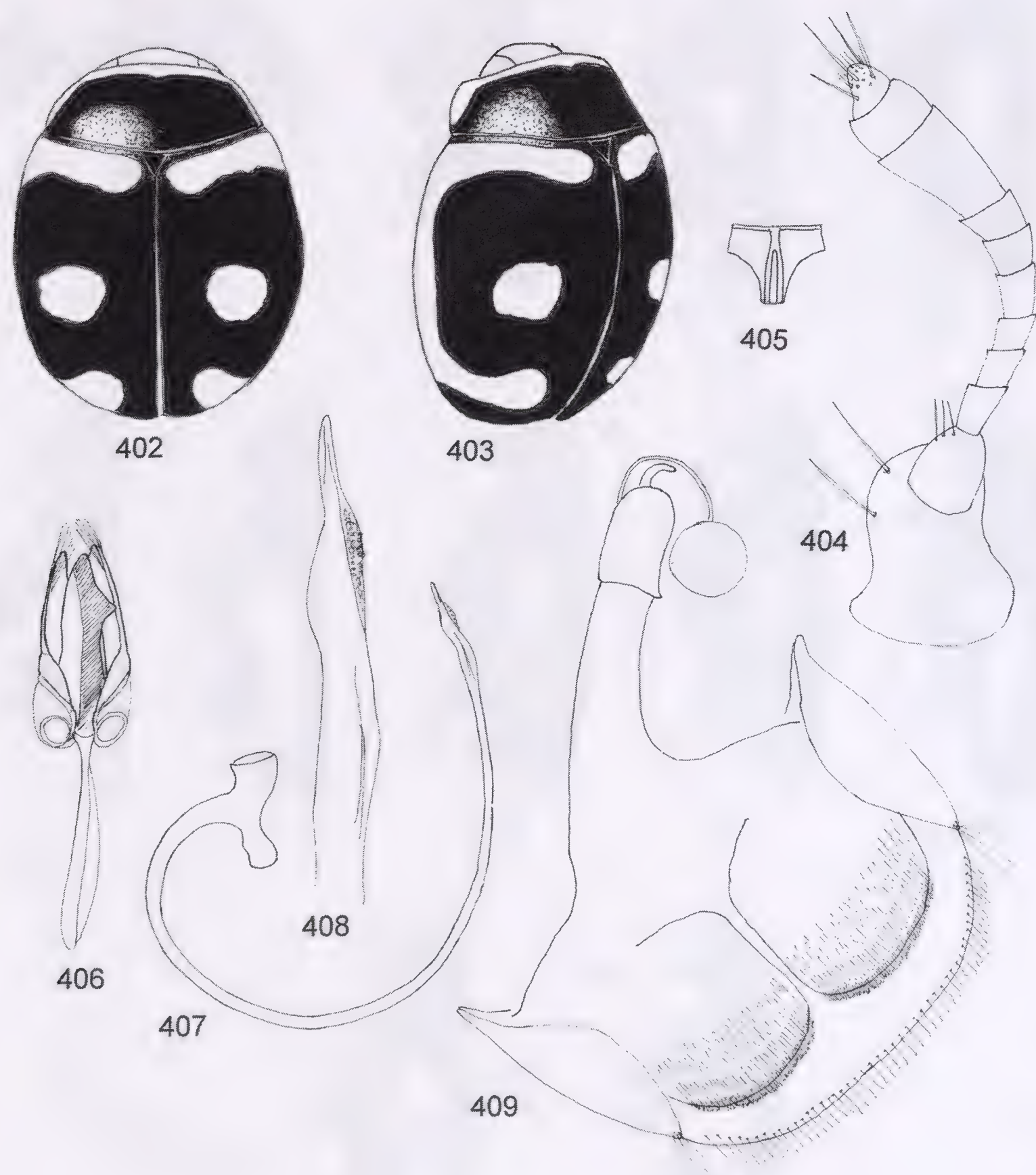
Figs. 379-385 - *Hyperaspis vredenburgi* structures. 379-380, habitus. 381, antenna. 382-384, male genitalia. 382, phallobase; 383, siphon; 384, enlarged siphonal apex. 385, female genitalia.



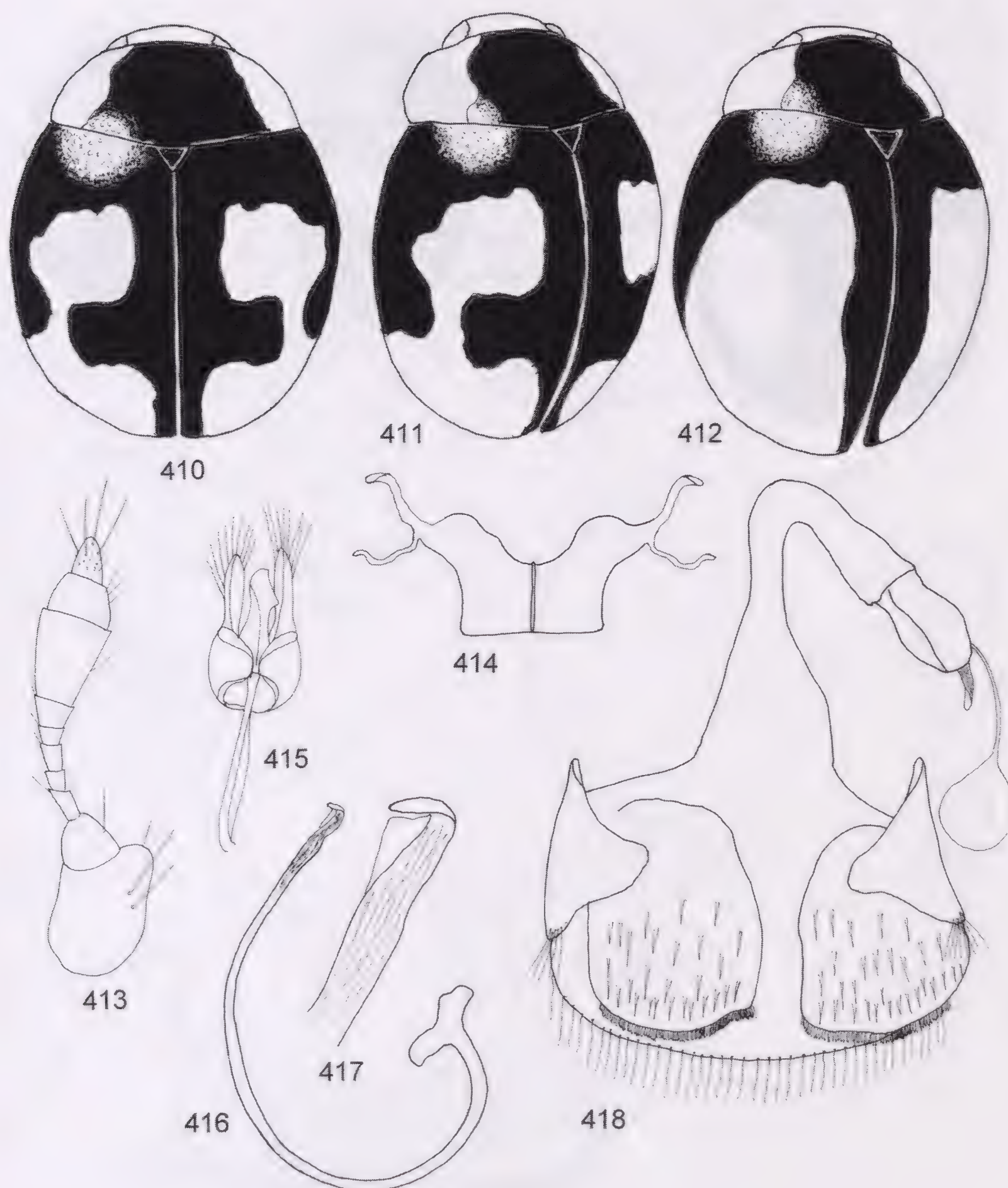
Figs. 386-396 - *Hyperaspis festiva* habitus and variations.



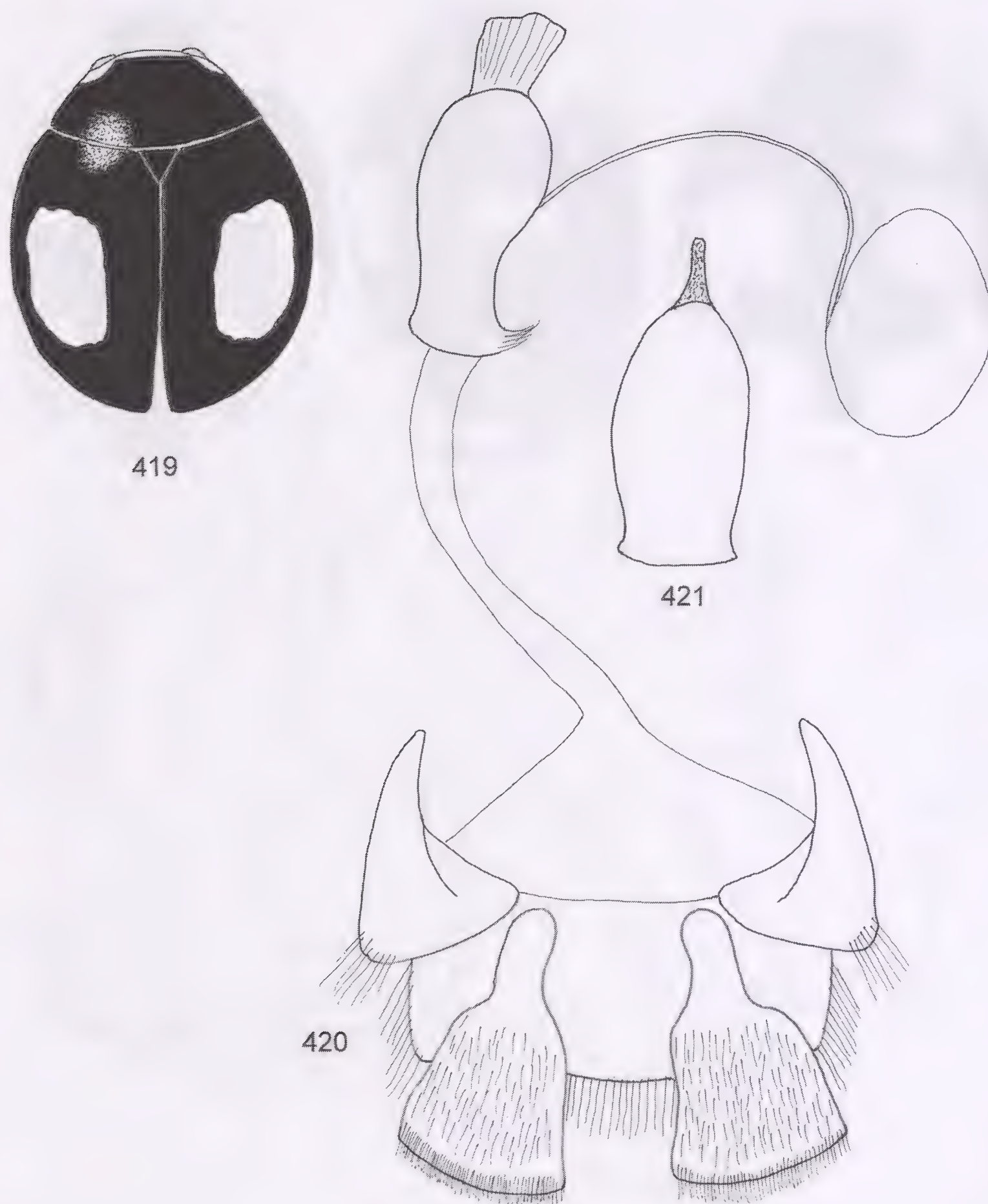
Figs. 397-401 - *Hyperaspis festiva* structures. 397, antenna. 398-400, male genitalia. 398, phallobase; 399, siphon; 400, enlarged siphonal apex. 401, female genitalia.



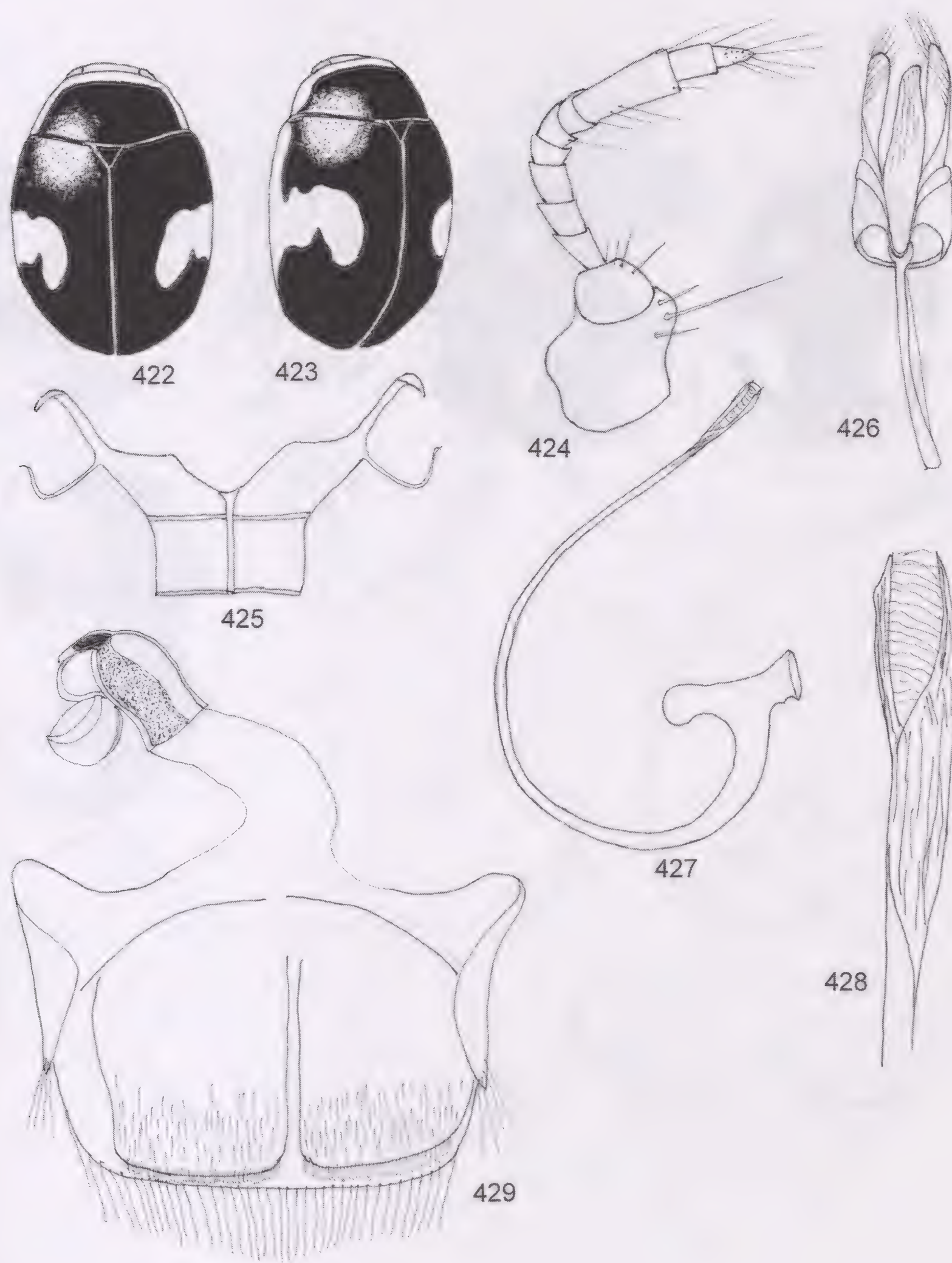
Figs. 402-409 - *Hyperaspis germainii* structures. 402-403, habitus. 404, antenna. 405, prosternum. 406-408, male genitalia. 406, phallobase; 407, siphon; 408, enlarged siphonal apex. 409, female genitalia.



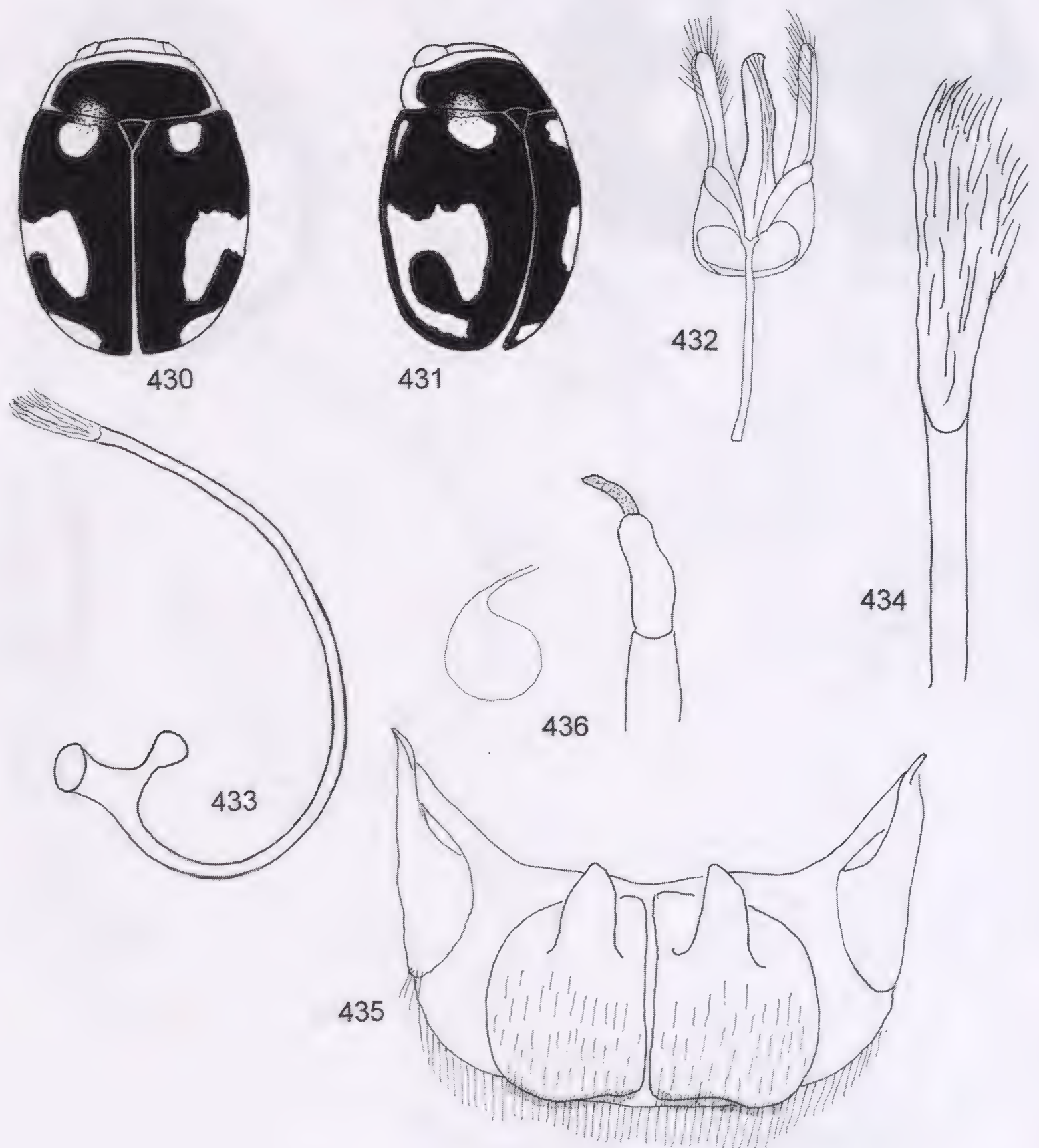
Figs. 410-418 - *Hyperaspis connectens* structures. 410-412, habitus and variations. 413, antenna. 414, metendosternite. 415-417, male genitalia. 415, phallobase; 416, siphon; 417, enlarged siphonal apex. 418, female genitalia.



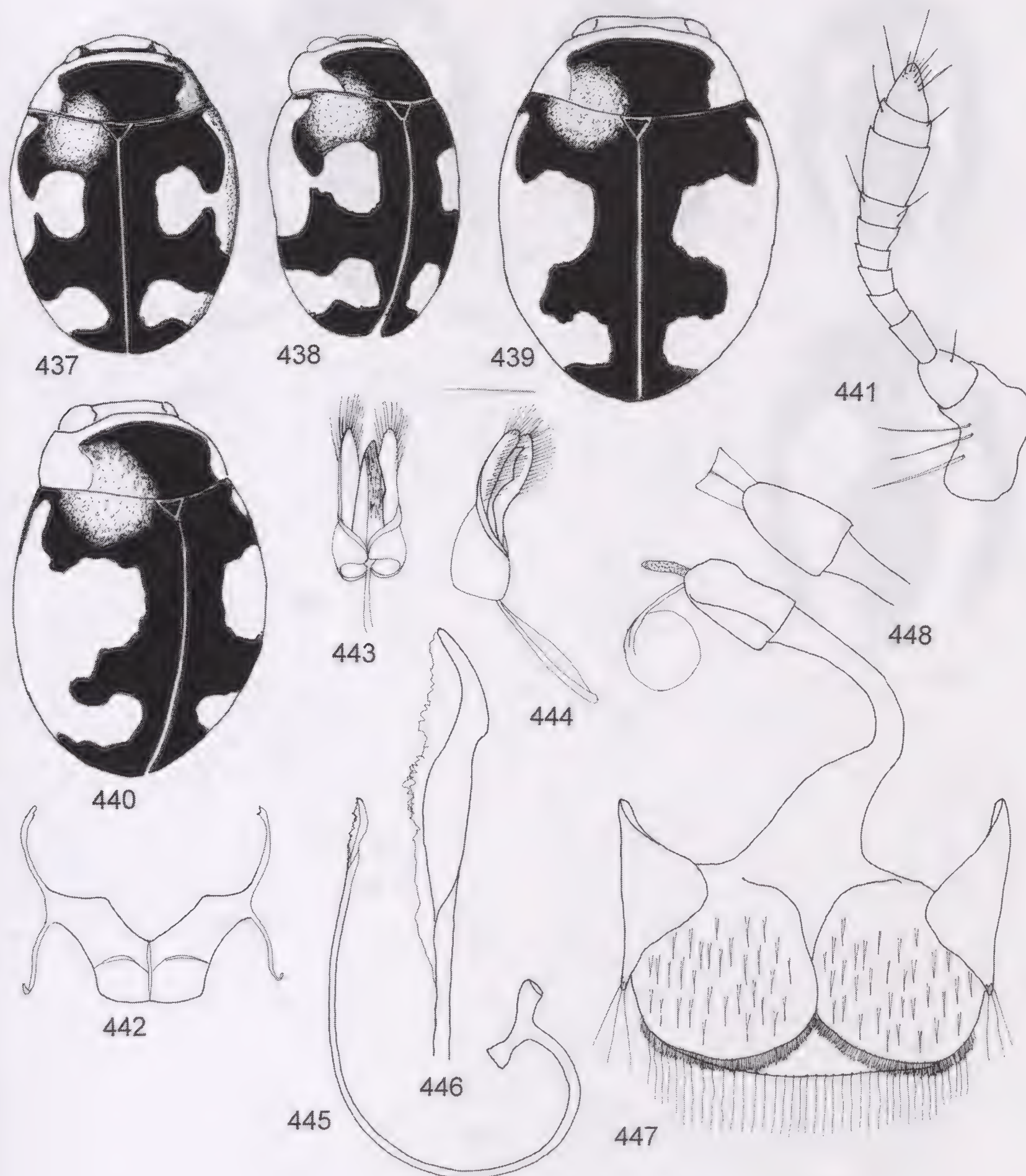
Figs. 419-421 - *Hyperaspis ingrata* habitus and female genitalia. 419, habitus. 420-421, female genitalia. 420, complete genitalia; 421, ventral view of basal unit.



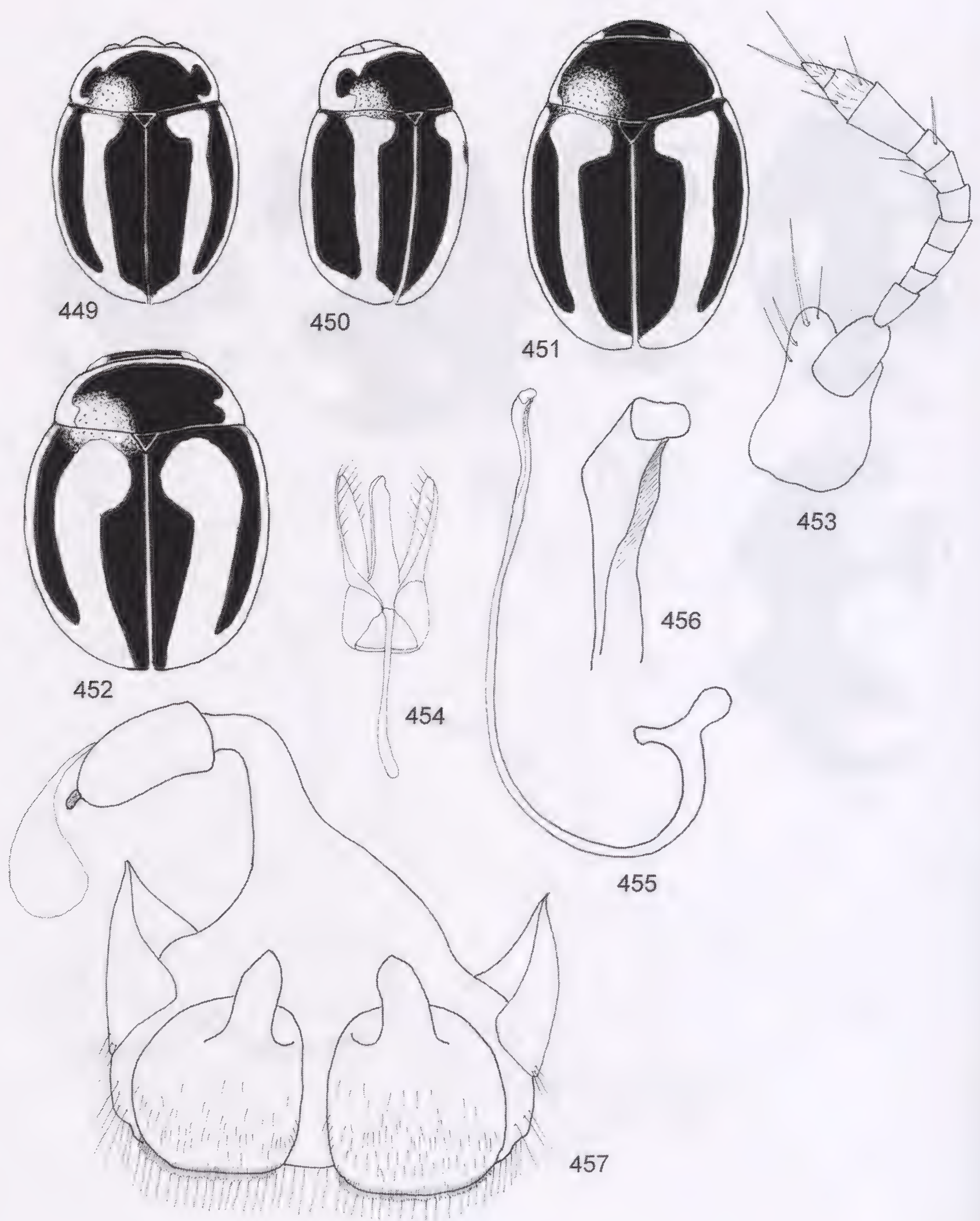
Figs. 422-429 - *Hyperaspis funesta* structures. 422-423, habitus. 424, antenna. 425, mendosternite. 426-428, male genitalia. 426, phallobase; 427, siphon; 428, siphonal apex. 429, female genitalia.



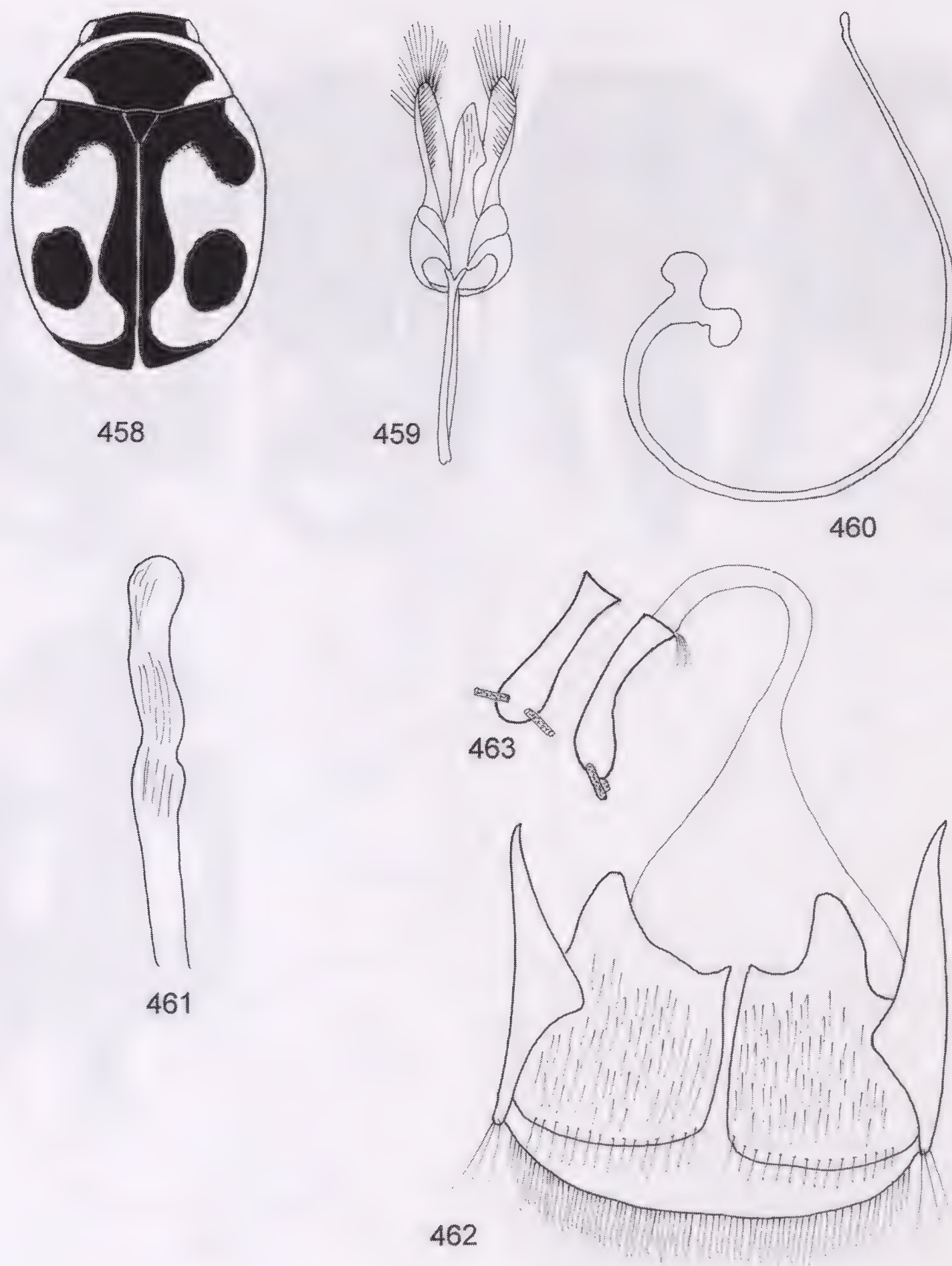
Figs. 430-436 - *Hyperaspis nana* habitus and genitalia. 430-431, habitus. 432-434, male genitalia. 432, phallobase; 433, siphon; 434, enlarged siphonal apex. 435-436, female genitalia. 435, genital plates; 436, distal portion, ventral view of basal portion.



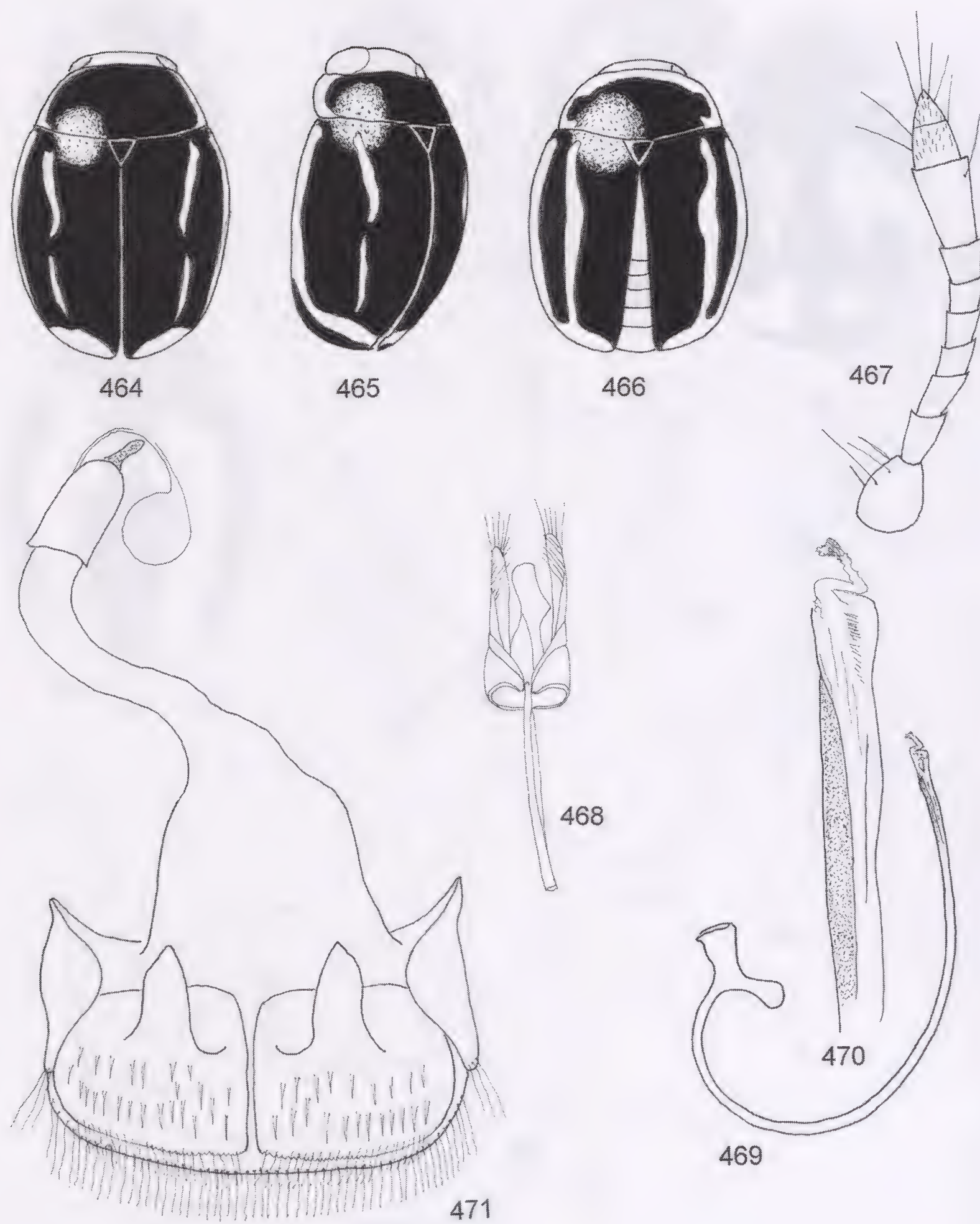
Figs. 437-448 - *Hyperaspis sphaeridioides* structures. 437-440, habitus and variations. 441, antenna. 442, metendosternite. 443-446, male genitalia. 443, phallobase, ventral view; 444, phallobase, lateral view; 445, siphus; 446, enlarged siphonal apex; 447-448, female genitalia. 447, complete genitalia; 448, lateral view of basal unit.



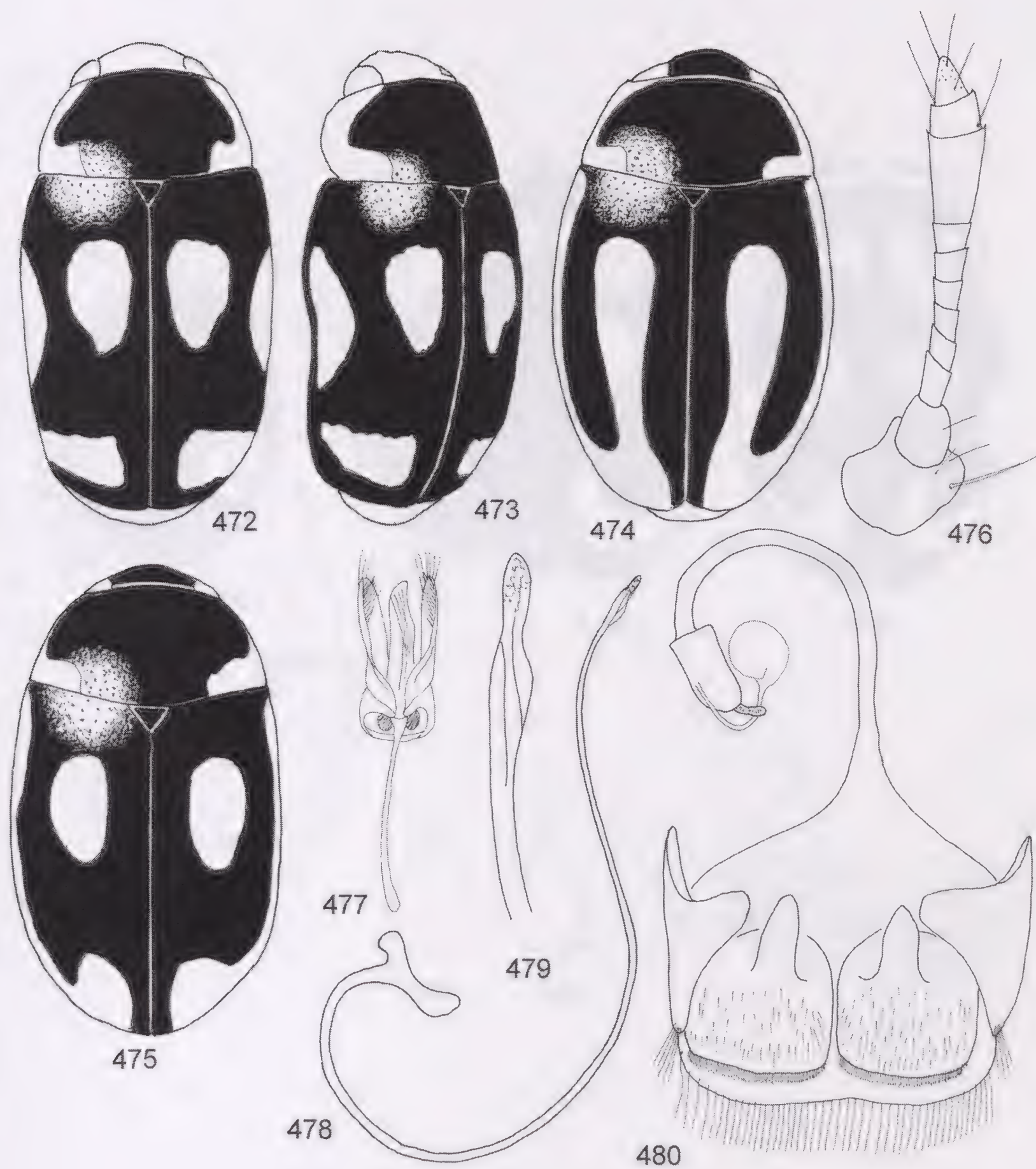
Figs. 449-457 - *Hyperaspis conclusa* structures. 449-452, habitus and variations. 453, antenna. 454-456, male genitalia. 454, phallobase; 455, siphon; 456, enlarged siphonal apex. 457, female genitalia.



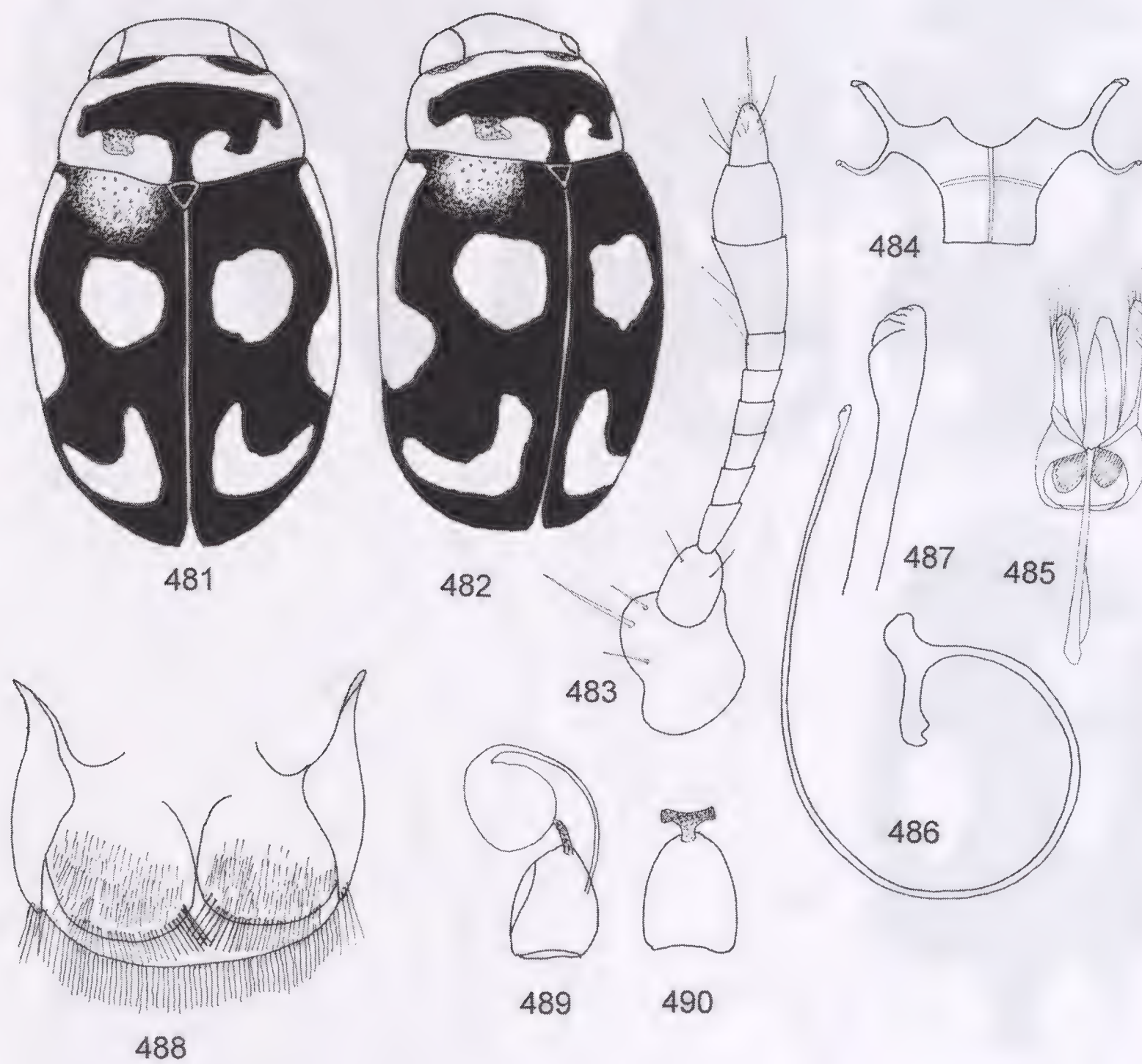
Figs. 458-463 - *Hyperaspis arida* habitus and genitalia. 458, habitus. 459-461, male genitalia. 459, phallobase; 460, siphus; 461, enlarged siphonal apex. 462-463, female genitalia. 462, complete genitalia, basal unit in ventral view; 463, basal unit in lateral view.



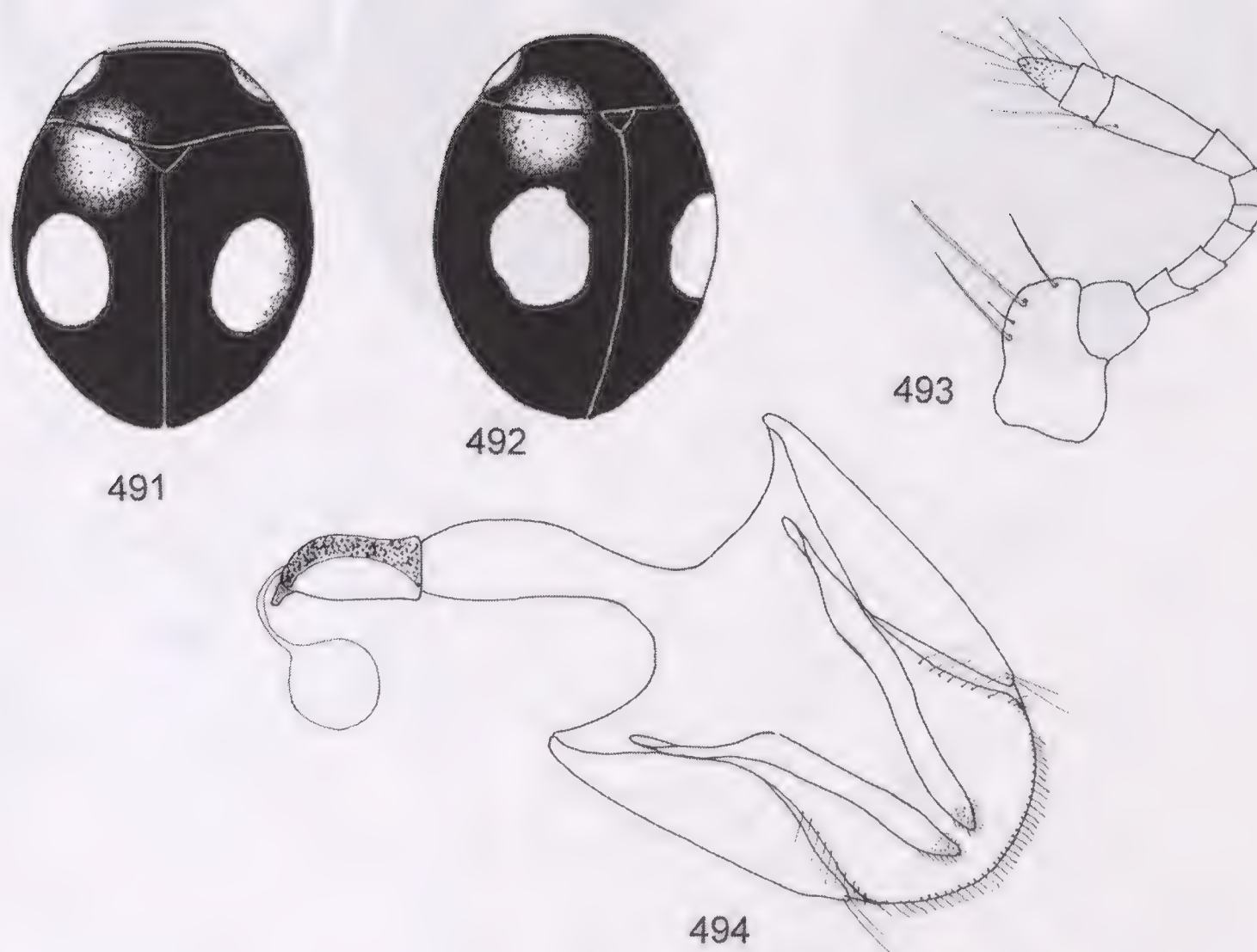
Figs. 464-471 - *Hyperaspis elegantissima* structures. 464-466, habitus and variations. 467, antenna. 468-470, male genitalia. 468, phallobase; 469, siphon; 470, enlarged siphonal apex. 471, female genitalia.



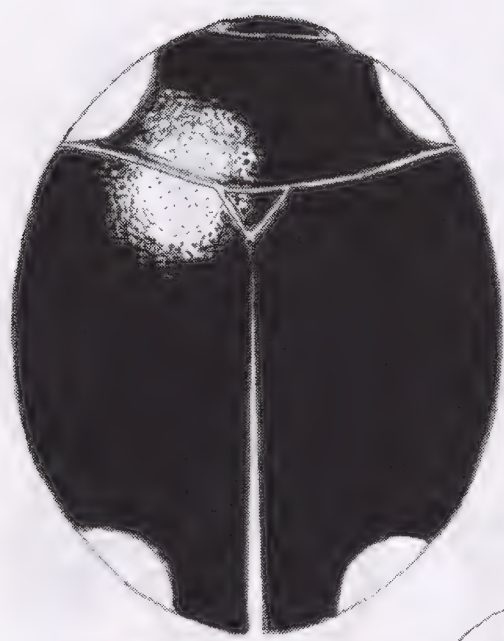
Figs. 472-480 - *Hyperaspis longula* structures. 472-475, habitus and variations. 476, antenna. 477-479, male genitalia. 477, phallobase; 478, siphon; 479, enlarged siphonal apex. 480, female genitalia.



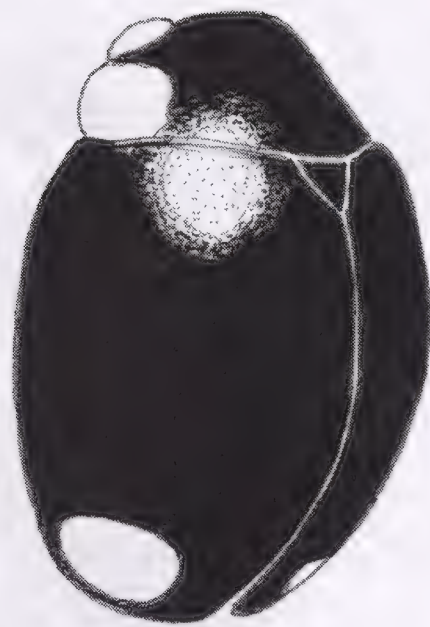
Figs. 481-490 - *Hyperaspis prolata* structures. 481-482, habitus. 483, antenna. 484, metendosternite. 485-487, male genitalia. 485, phallobase; 486, siphon; 487, siphonal apex. 488-490, female genitalia. 488, genital plates; 489, ventral view of basal and distal units; 490, lateral view of basal unit.



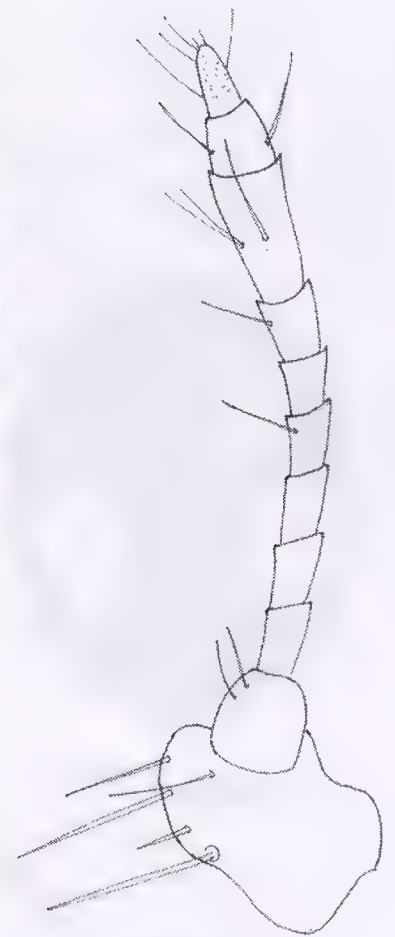
Figs. 491-494 - *Temuisvalvae unipunctata* structures. 491-492, habitus. 493, antenna. 494, female genitalia.



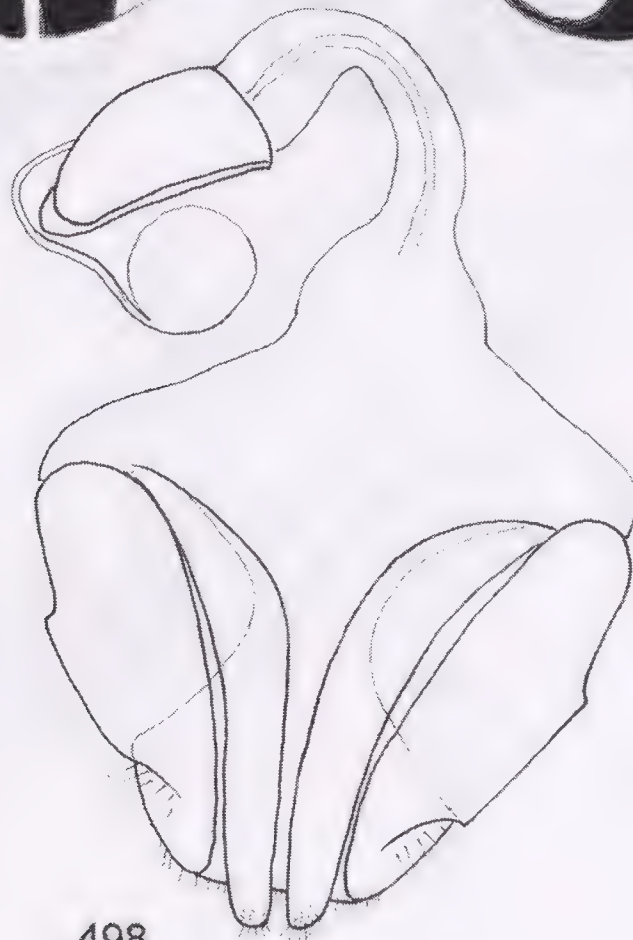
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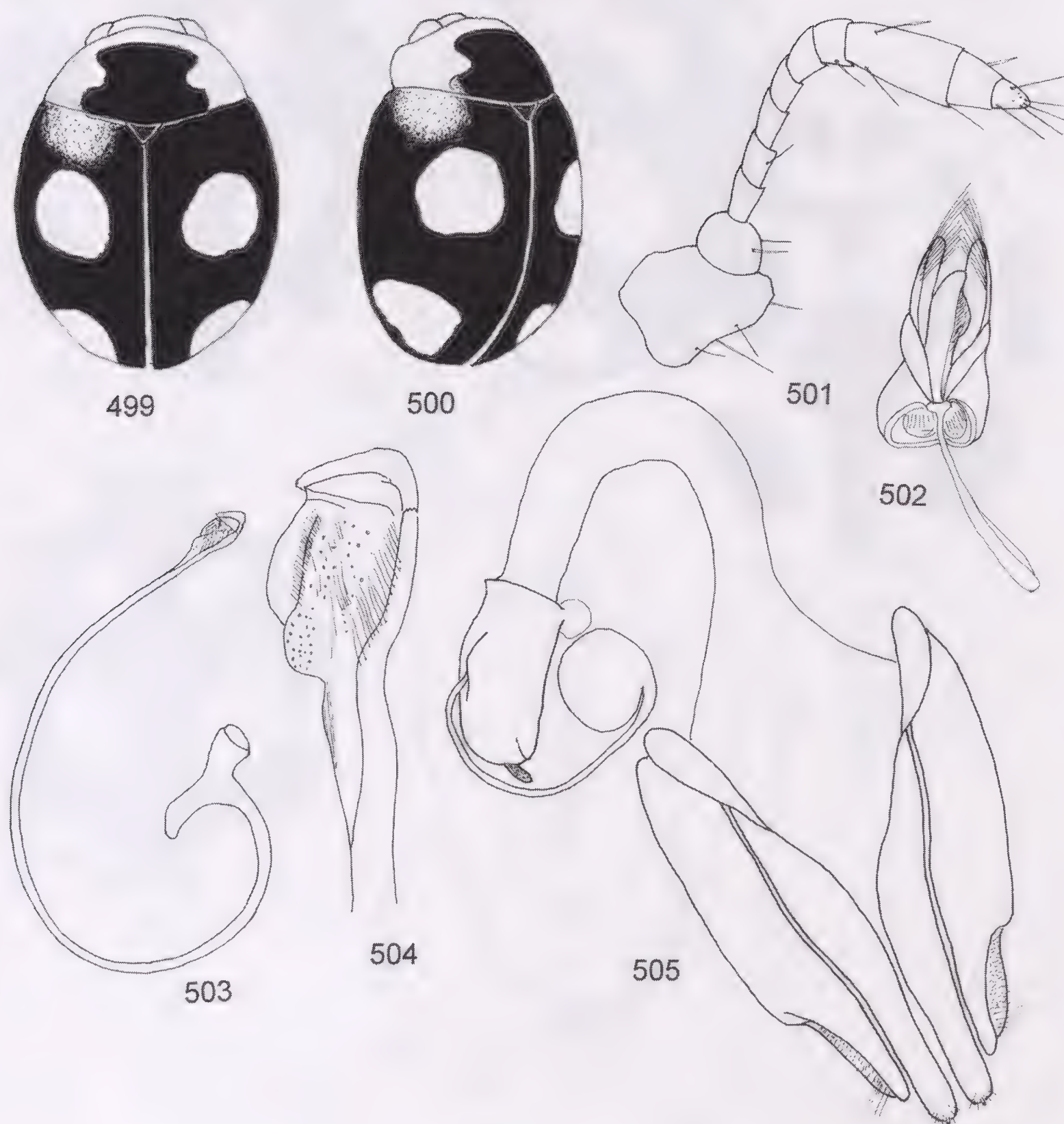


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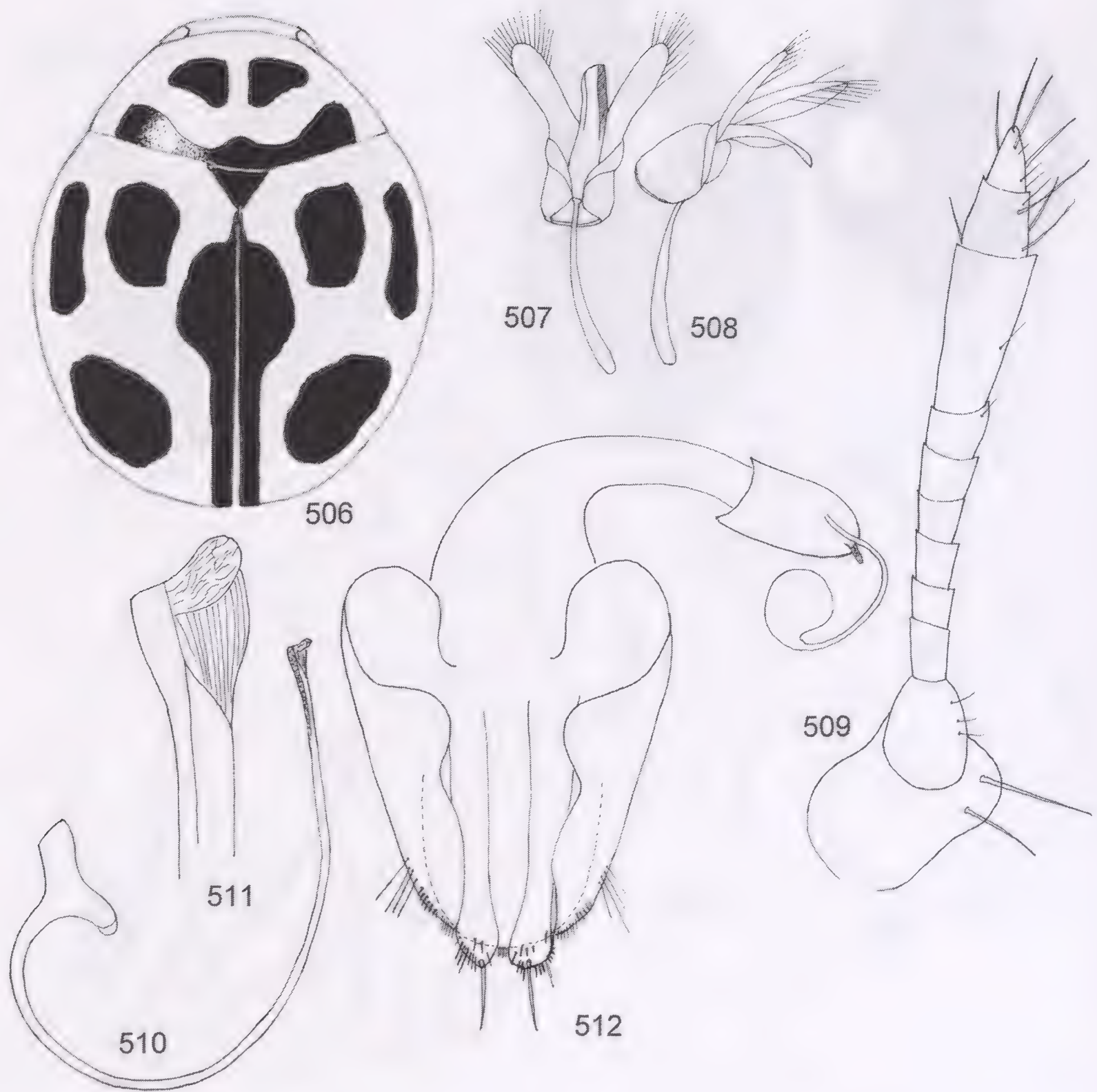


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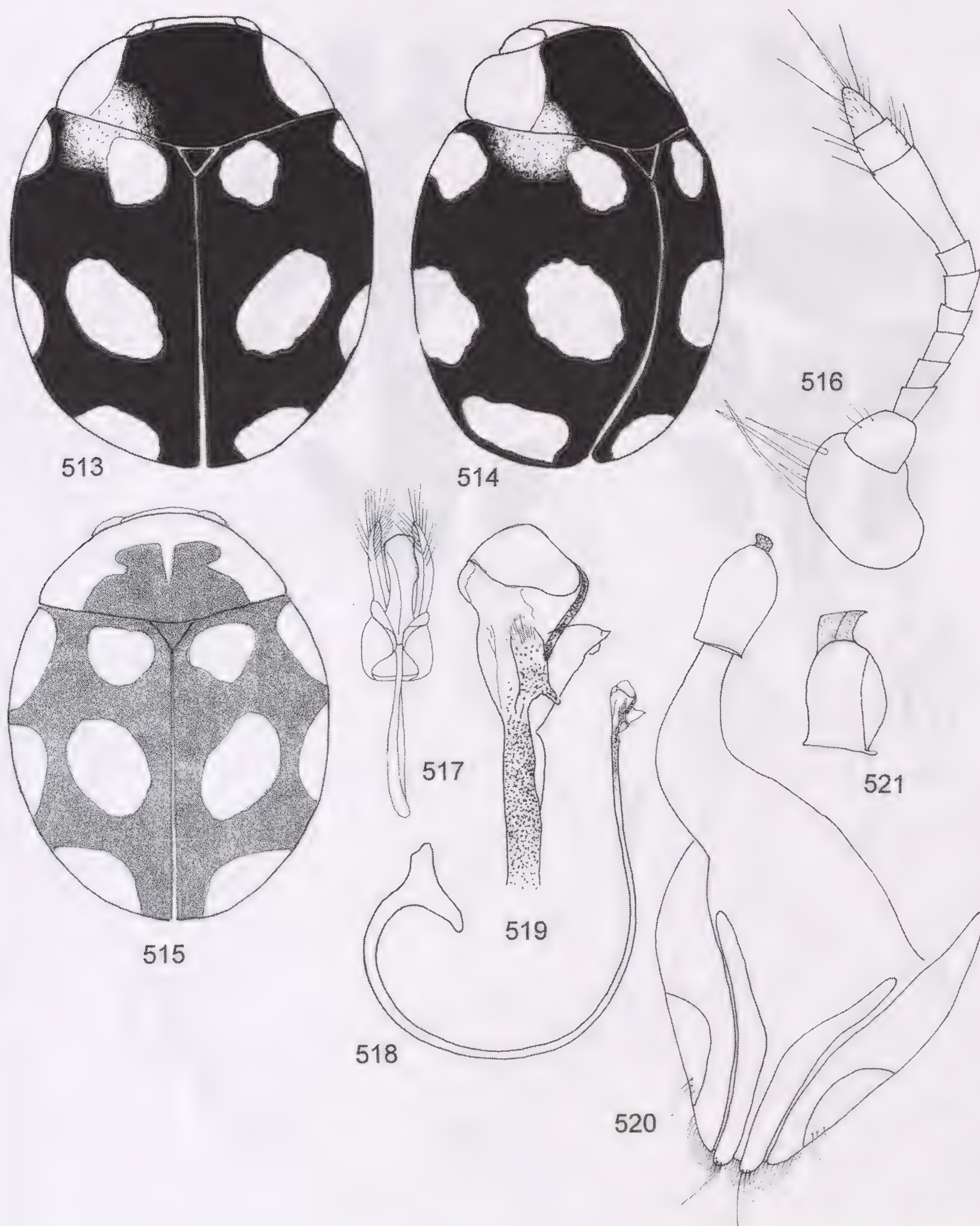
Figs. 495-498 - *Temuisvalvae peregrina* structures. 495-496, habitus. 497, antenna. 498, female genitalia.



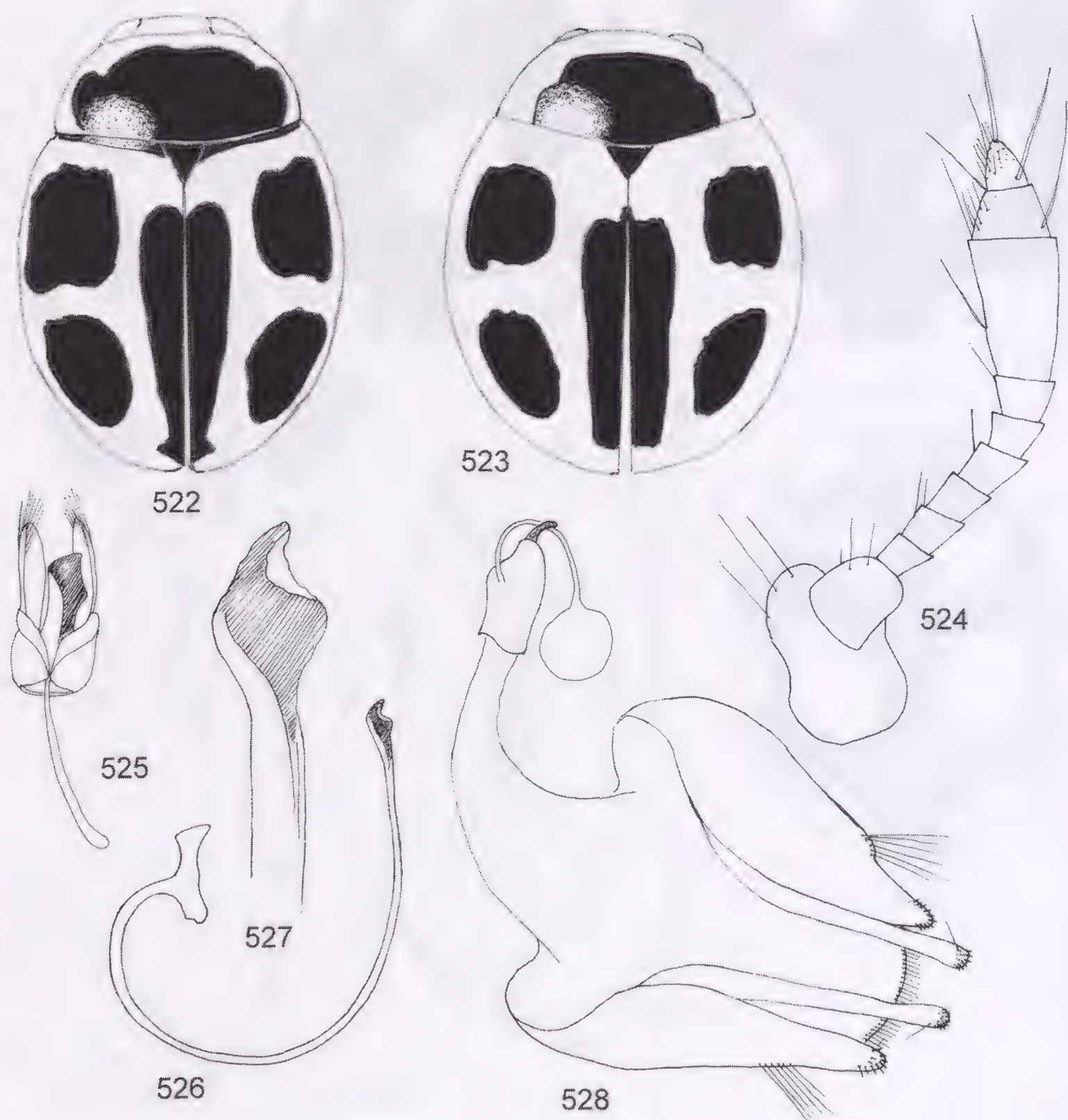
Figs. 499-505 - *Tenuisvalvae deyrollei* structures. 499-500, habitus. 501, antenna. 502-504, male genitalia. 502, phallobase; 503, siphon; 504, enlarged siphonal apex. 505, female genitalia.



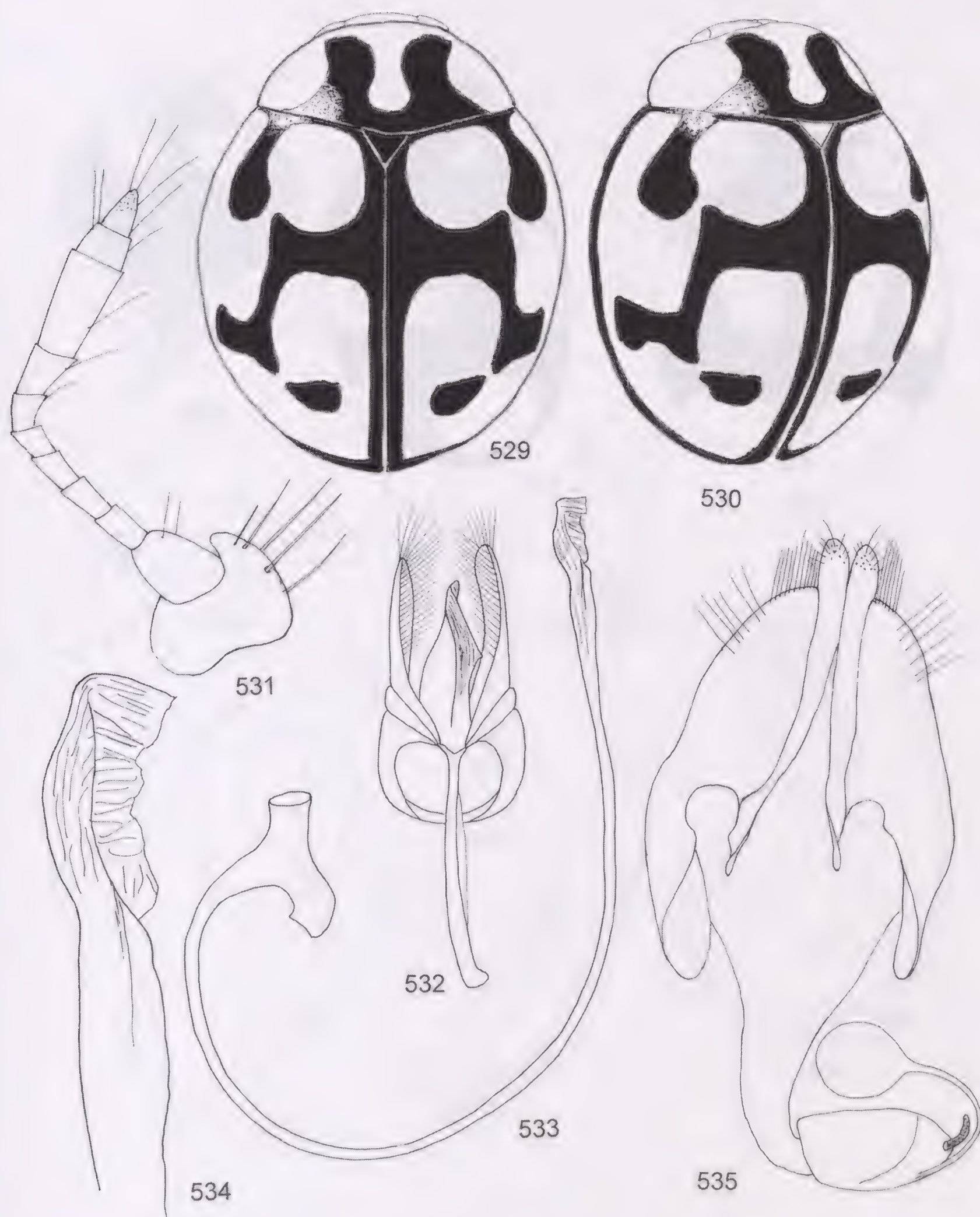
Figs. 506-512 - *Temisvalvae notata* structures. 506, habitus. 509, antenna. 507-511, male genitalia. 507, ventral view of phallobase; 508, lateral view of phallobase; 510, siphon; 511, enlarged siphonal apex. 512, female genitalia.



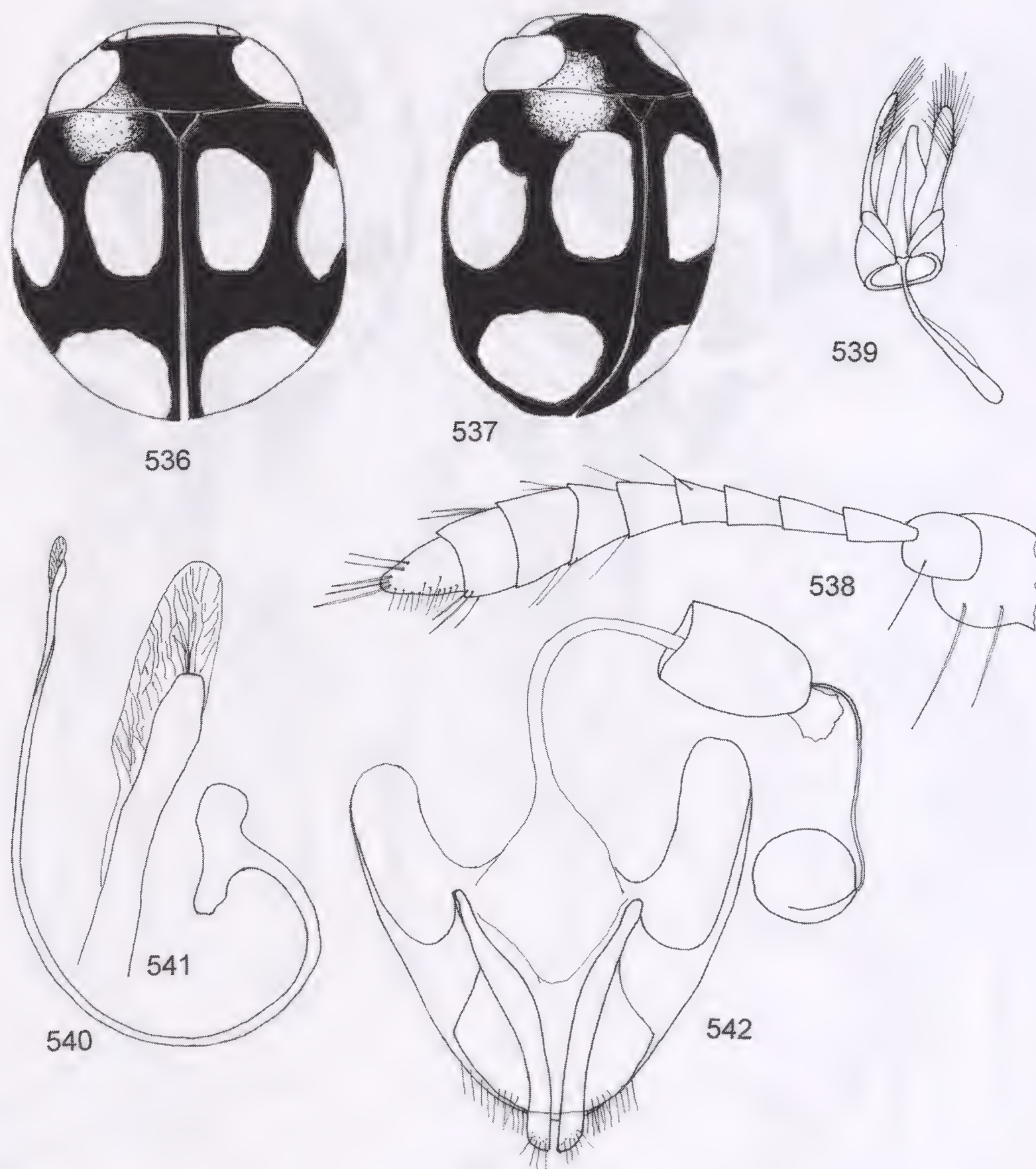
Figs. 513-521 - *Temisvalvae bisquinquepustulata* structures. 513-515, habitus. 516, antenna. 517-519, male genitalia. 517, phallobase; 518, siphon; 519, enlarged siphonal apex. 520-521, female genitalia. 520, complete genitalia; 521, lateral view of basal unit.



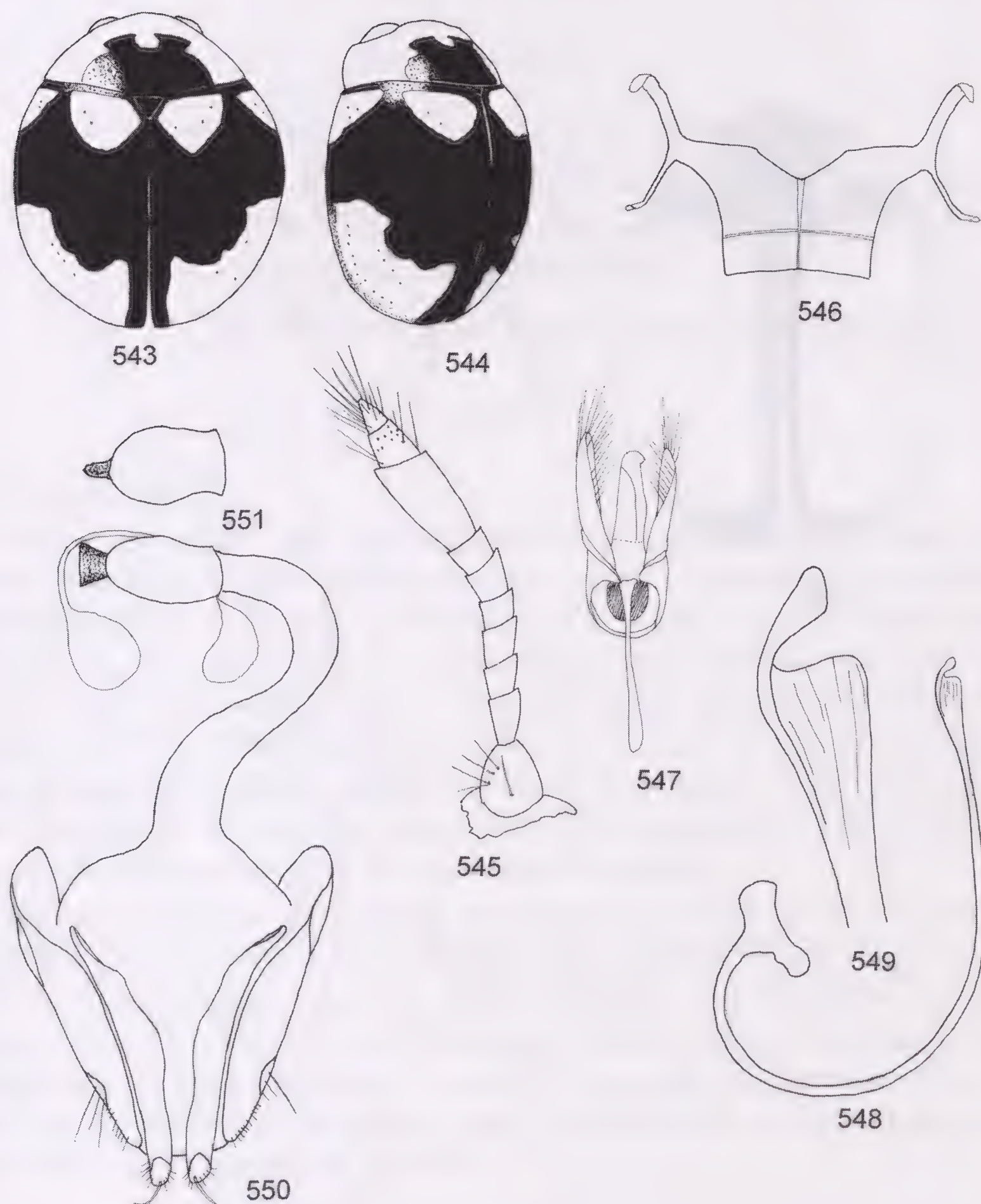
Figs. 522-528 - *Temuisvalvae ecoffeti* structures. 522-523, habitus. 524, antenna. 525-527, male genitalia. 525, phallobase; 526, siphon; 527, enlarged siphonal apex. 528, female genitalia.



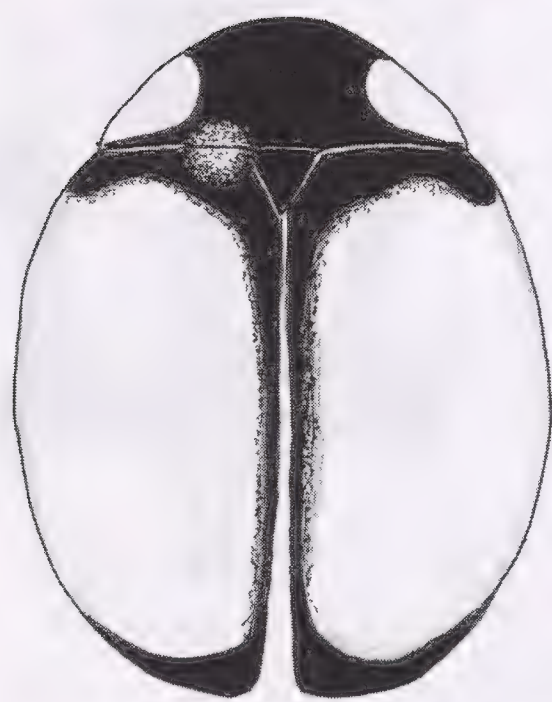
Figs. 529-535 - *Temuisvalvae parenthesis* structures. 529-530, habitus. 531, antenna. 532-534, male genitalia. 532, phallobase; 533, siphus; 534, enlarged siphonal apex. 535, female genitalia.



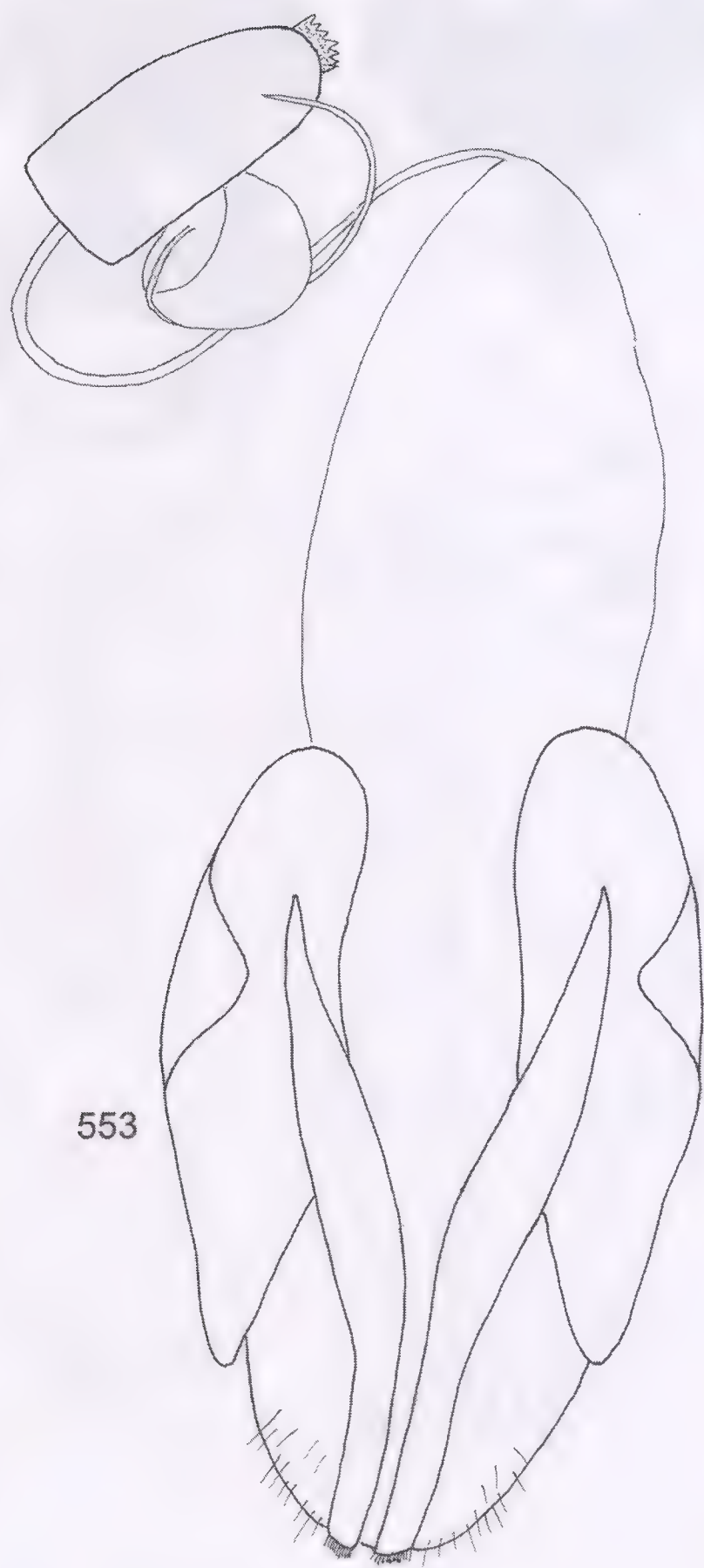
Figs. 536-542 - *Tenuisvalvae caucaensis* structures. 536-537, habitus. 538, antenna. 539-541, male genitalia. 539, phallobase; 540, siphon; 541, siphonal apex. 542, female genitalia.



Figs. 543-551 - *Temuisvalvae bromelicola* structures. 543-544, habitus. 545, antenna. 546, metendosternite. 547-549, male genitalia. 547, phallobase; 548, siphon; 549, enlarged siphonal apex. 550-551, female genitalia. 550, complete genitalia; 551, ventral view of basal unit.



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Figs. 552-553 - *Temisvalvae gnoma* habitus and female genitalia. 552, habitus. 553, female genitalia.

RES LIGUSTICAE CCLIII

LUCA BAGHINO*

MONITORAGGIO DELLA MIGRAZIONE
POST-RIPRODUTTIVA DEI RAPACI DIURNI NELLA
ZONA DI PROTEZIONE SPECIALE IT 1331578
“BEIGUA-TURCHINO”

(AVES, ACCIPITRIFORMES ET FALCONIFORMES)

INTRODUZIONE

Da circa dieci anni la migrazione dei rapaci rappresenta, nel panorama ornitologico nazionale, un ambito tematico di notevole interesse ed in continua evoluzione. Tra i siti “storici” dall’inizio dei primi controlli sulla migrazione pre-riproduttiva risalenti alla metà degli anni ottanta del secolo da poco passato (BAGHINO & LEUGIO 1989 e 1990; BAGHINO 1996; ZALLES & BILDSTEIN 2000), i contrafforti e le vallate appenniniche di Arenzano (GE) continuano ad essere luogo di conteggi sistematici e standardizzati tali da offrire una serie temporale di dati relativamente estesa.

La designazione della Zona di Protezione Speciale (*ex* Direttiva 79/409/CEE “Uccelli”) IT 1331578 “Beigua-Turchino” e gli obblighi di monitoraggio imposti dalla Direttiva 79/409 hanno infatti comportato l’avvio di nuovi conteggi¹ finalizzati ad acquisire dati aggiornati ed altri elementi conoscitivi intorno al fenomeno migratorio delle specie appartenenti agli ordini degli Accipitriformes e Falconiformes oggetto di tutela.

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¹ I conteggi sono stati svolti nel 2000 e 2001 con contributi dalla Provincia di Genova - Assessorato all’Ambiente e nel 2004, 2005 e 2006 su incarico dell’Ente Parco del Beigua nell’ambito delle azioni previste dal Progetto DOCUP Obiettivo 2 2000/2006 “Parco del Beigua: un Parco per la biodiversità: conoscenza, tutela e valorizzazione della ZPS Beigua - Turchino”, cofinanziato dall’Unione Europea.

Essendo la migrazione post-riproduttiva dei rapaci molto meno nota in sede locale fino al 1999, è stato avviato un periodo di campionamento standardizzato di 12 giorni, avente come specie obiettivo il Biancone *Circaetus gallicus* (Gmelin, 1788).

METODI, TECNICHE E PROTOCOLLI DI LAVORO

Il monitoraggio è stato condotto sui contrafforti montuosi di Arenzano (44° 25' 23" N - 8° 40' 53" E), nella parte sud-orientale della ZPS "Beigua-Turchino".

L'area insiste sul versante tirrenico dello spartiacque principale appenninico, solcato da valli trasversali brevi e acclivi: il sistema orografico del Ponente genovese, nei territori comunali di Genova ed Arenzano, registra la minima ampiezza trasversale e i minimi valori di distanza dei rilievi dalla costa.

Le osservazioni hanno avuto luogo prevalentemente in due postazioni ubicate su culminazioni a quote tra i 300 e i 600 m s.l.m. lungo un crinale secondario che, dividendo le valli dei rii Cantarena e Lissolo secondo un asse NNE-SSO, presenta ampie vedute panoramiche con campo visivo di almeno 180 gradi in direzione est/nord-est, cioè verso i settori di provenienza degli individui migranti. Le postazioni sono state di giorno in giorno scelte sulla base dei venti dominanti e dell'altitudine della copertura nuvolosa che influenzano la dislocazione e l'altezza da terra delle rotte di volo.

Il conteggio del Biancone e delle altre specie di rapaci diurni (Accipitriformes, Falconiformes) è stato continuativamente svolto dal 2000 al 2006 nel periodo dal 15 al 26 settembre con sessioni giornaliere di osservazione di otto ore (dalle 9 alle 17, ora solare) suddivise in quattro fasce orarie di transito (9-11; 11-13; 13-15; 15-17). Le osservazioni sono state compiute lungo l'intero arco temporale e sono state temporaneamente sospese solo in presenza di rovesci piovosi.

Il periodo di conteggio è stato disposto attorno al picco di passaggio (22 e 23 settembre) del Biancone quale era risultato in seguito a rilievi compiuti in giornate discontinue nel 1998 e 1999, con avvio dalla metà del mese in modo da non escludere apprezzabili movimenti migratori della specie già in corso dopo il 5-10 settembre.

Le osservazioni sono state compiute mediante binocoli (7x42) e cannocchiale (28x66, 32x77) montato su treppiede.

Nelle giornate con più osservatori divisi in due squadre, si è fatto ricorso a radio VHF per lo scambio di informazioni, finalizzato a contenere i casi di mancato avvistamento di individui in migrazione e ad escludere nel contempo doppi conteggi.

Sono state raccolte, quando possibile, informazioni relative all'età dei soggetti migranti di Biancone, sulla base dei caratteri e dei criteri descritti da FORSMAN 1999 e da CLARK 2003.

I dati sono stati annotati su due tipi di schede:

- la prima, specificamente studiata per il monitoraggio del Biancone, riportava dati relativi ai soggetti migranti della specie con particolare riferimento all'età e ad eventuali dettagli sullo stato di muta;
- la seconda, utilizzata dal 1991 per i conteggi dei rapaci migratori, riguardava il transito migratorio di tutte le altre specie di Accipitriformes e Falconiformes, con maggiori dettagli riguardanti, oltre all'ora di avvistamento, al numero, all'età e o al sesso degli individui, le variabili meteorologiche (forza e direzione del vento secondo la scala Beaufort, copertura e stato del cielo, visibilità) e di passaggio (provenienza, direzione di svanimento e altitudine di volo in base a fasce altimetriche stimate di 300 m ognuna, quest'ultima dal 2005 misurata quando tecnicamente possibile con telemetro laser).

Non sono state riportate sulle schede le osservazioni dubitativamente attribuibili a individui locali (è il caso del Biancone, presente come estivo nidificante di norma fino al 25 settembre, della Poiana, del Gheppio, dello Sparviere); sono stati considerati in migrazione i soggetti osservati per almeno tre minuti senza soste e significative deviazioni dalla direzione standard di volo.

In considerazione della distribuzione verosimilmente non normale dei dati derivati da conteggi, si sono impiegati vari test statistici non parametrici.

Le specie sono ordinate secondo l'assetto sistematico e la nomenclatura adottati da BRICHETTI & MASSA (1998).

RISULTATI

Sono stati complessivamente osservati 4907 individui appartenenti a 12 specie di Accipitriformes e a 4 di Falconiformes (Tab. I)

Tab. I - Migrazione post-riproduttiva dei Rapaci dal 15 al 26 settembre nella ZPS IT 1331578 “Beigua-Turchino”

Migrazione post-riproduttiva dei Rapaci dal 15 al 26 settembre nella ZPS IT 1331578 “Beigua-Turchino								
	2000	2001	2002	2003	2004	2005	2006	TOTALE
<i>Pernis apivorus</i>	55	43	55	47	56	41	94	391
<i>Milvus migrans</i>	0	2	0	2	7	0	2	13
<i>Milvus milvus</i>	2	2	6	3	0	3	2	18
<i>Circus gallicus</i>	476	542	585	280	651	683	707	3924
<i>Circus aeruginosus</i>	29	48	29	13	10	40	49	218
<i>Circus cyaneus</i>	0	0	0	1	0	0	0	1
<i>Accipiter nisus</i>	14	3	24	2	23	5	10	81
<i>Buteo buteo</i>	10	3	6	2	5	10	6	42
<i>Buteo buteo vulpinus</i>	3	0	1	1	0	0	0	5
<i>Buteo rufinus</i>	0	1	0	0	0	0	0	1
<i>Buteo</i> sp.	0	0	0	0	1	0	0	1
<i>Aquila pomarina</i>	0	0	0	0	0	1	0	1
<i>Hieraetus pennatus</i>	1	2	0	3	2	70	59	137
<i>Accipitridae</i> indeterminato	0	0	0	0	1	4	8	13
<i>Pandion haliaetus</i>	2	1	0	0	4	4	2	13
<i>Falco tinnunculus</i>	3	0	2	0	0	0	0	5
<i>Falco tinnunculus-naumanni</i>	0	0	0	0	1	3	6	10
<i>Falco columbarius</i>	0	0	0	1	0	1	0	2
<i>Falco subbuteo</i>	1	3	3	2	0	6	3	18
<i>Falco peregrinus</i>	2	0	1	1	1	0	1	6
<i>Falco</i> sp.	3	0	0	0	2	0	1	6
Rapace indeterminato	0	1	0	0	0	0	0	1
TOTALE	601	651	712	358	764	871	950	4907

Ordine ACCIPITRIFORMES

Famiglia ACCIPITRIDAE

Falco pecchiaiolo *Pernis apivorus* (Linnaeus, 1758)

Seconda specie in ordine di abbondanza, con indice di transito orario di 0,68 ind/h (Fig. 1).

La data mediana di migrazione della specie è risultata il 19 settembre. Nel confronto tra i contingenti annualmente campionati non è emersa una differenza significativa (test di Kruskal-Wallis $H = 3,50$; g.l. = 6; $P > 0,05$). Solo a 180 individui (46,15% del totale) si è potuta assegnare l'età con ragionevole certezza: 162 (90,0%) sono risultati giovani e solo 18 (10,00%) adulti. Massimo conteggio: 18 indd. il 17.IX.2006.

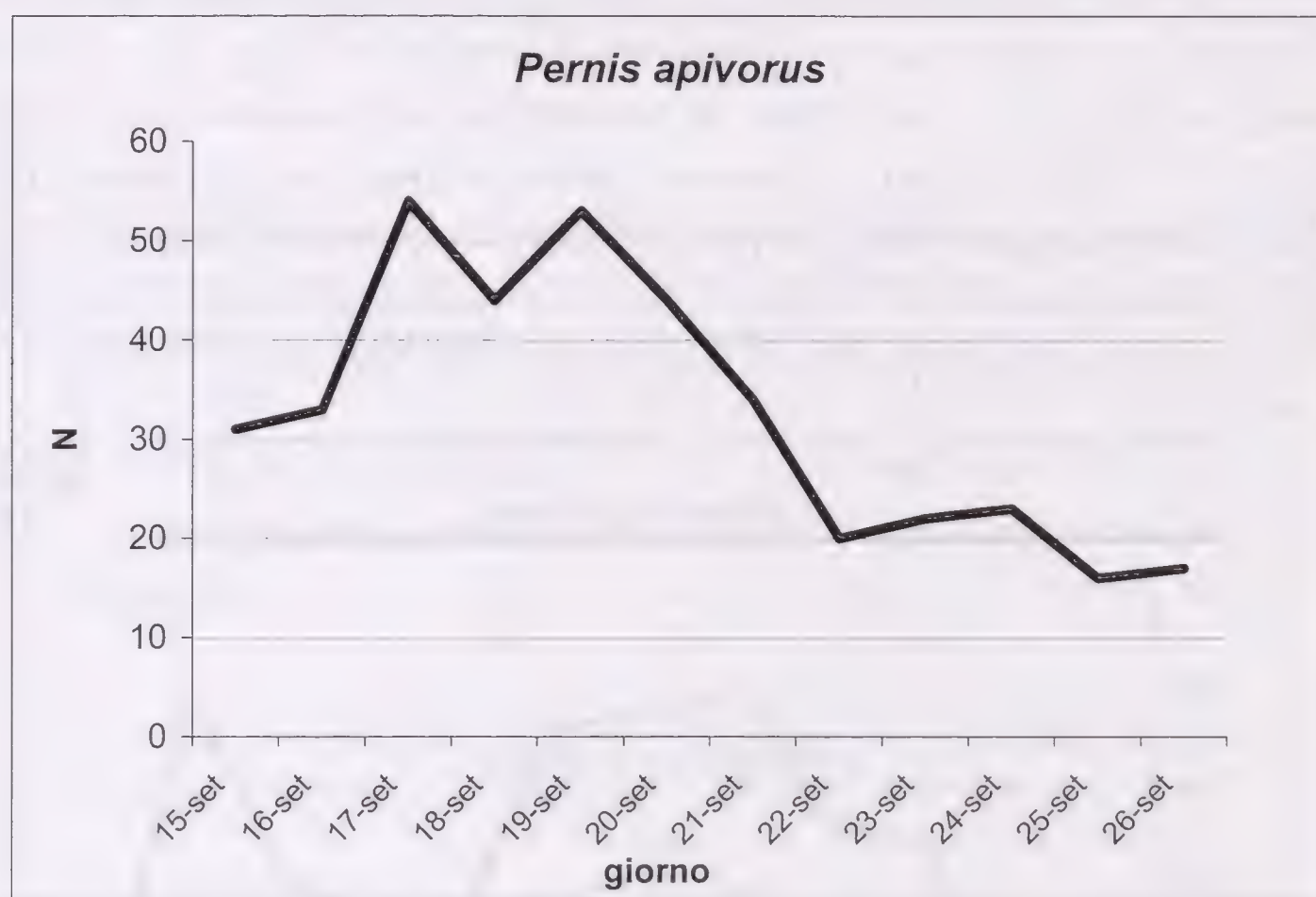


Fig. 1 - Fenologia della migrazione del Falco pecchiaiolo *Pernis apivorus* nel periodo di campionamento.

Nibbio bruno *Milvus migrans* (Boddaert, 1783)

Specie risultata scarsamente frequente, con indice di passaggio pari a 0,02 ind/h. Massimo conteggio: 3 indd. il 18.IX.2004.

Nibbio reale *Milvus milvus* (Linnaeus, 1758)

Specie di comparsa poco frequente, con indice di transito pari a 0,03 ind/h. Massimo conteggio: 3 indd. il 24.IX.2005.

Biancone *Circaetus gallicus* (Gmelin, 1788)

Gli aspetti legati alla definizione di uno schema migratorio denominato a “circuito” (AGOSTINI *et al.* 2002a), all'utilizzo di una strategia migratoria di tipo conservativo (AGOSTINI *et al.* 2002b) e di una strategia migratoria differenziale tra giovani e adulti (AGOSTINI *et al.* 2004) attraverso l'Italia sono già stati analizzati in precedenti lavori impiegando i risultati dei conteggi del 2000 e del 2001.

Il Biancone costituisce il 79,93% di tutti i rapaci migratori conteggiati nel periodo controllato; la sua migrazione presenta due differenti picchi secondo un andamento bimodale (Fig. 2). Gli indici di passaggio (Fig. 3), con linea di tendenza ad andamento crescente ($\mu=6,19\pm1,57$ D.S. ind/h), riflettono primariamente l'aumentata efficienza del campionamento, la più efficace copertura territoriale e le migliori conoscenze delle dinamiche del passaggio e del comportamento migratorio sito-specifico acquisite con gli anni.

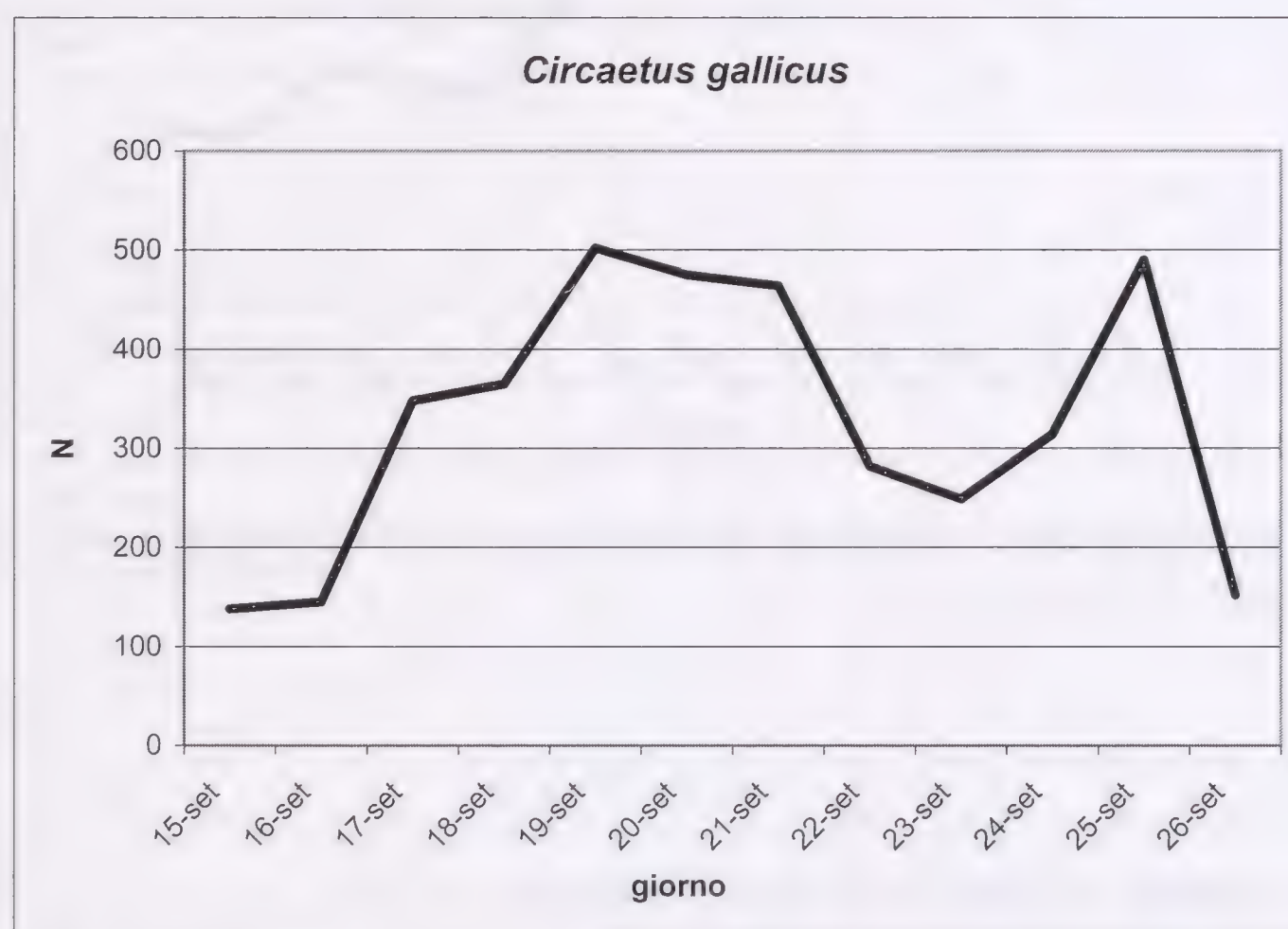


Fig. 2 - Fenologia della migrazione del Biancone *Circaetus gallicus* nel periodo di campionamento.

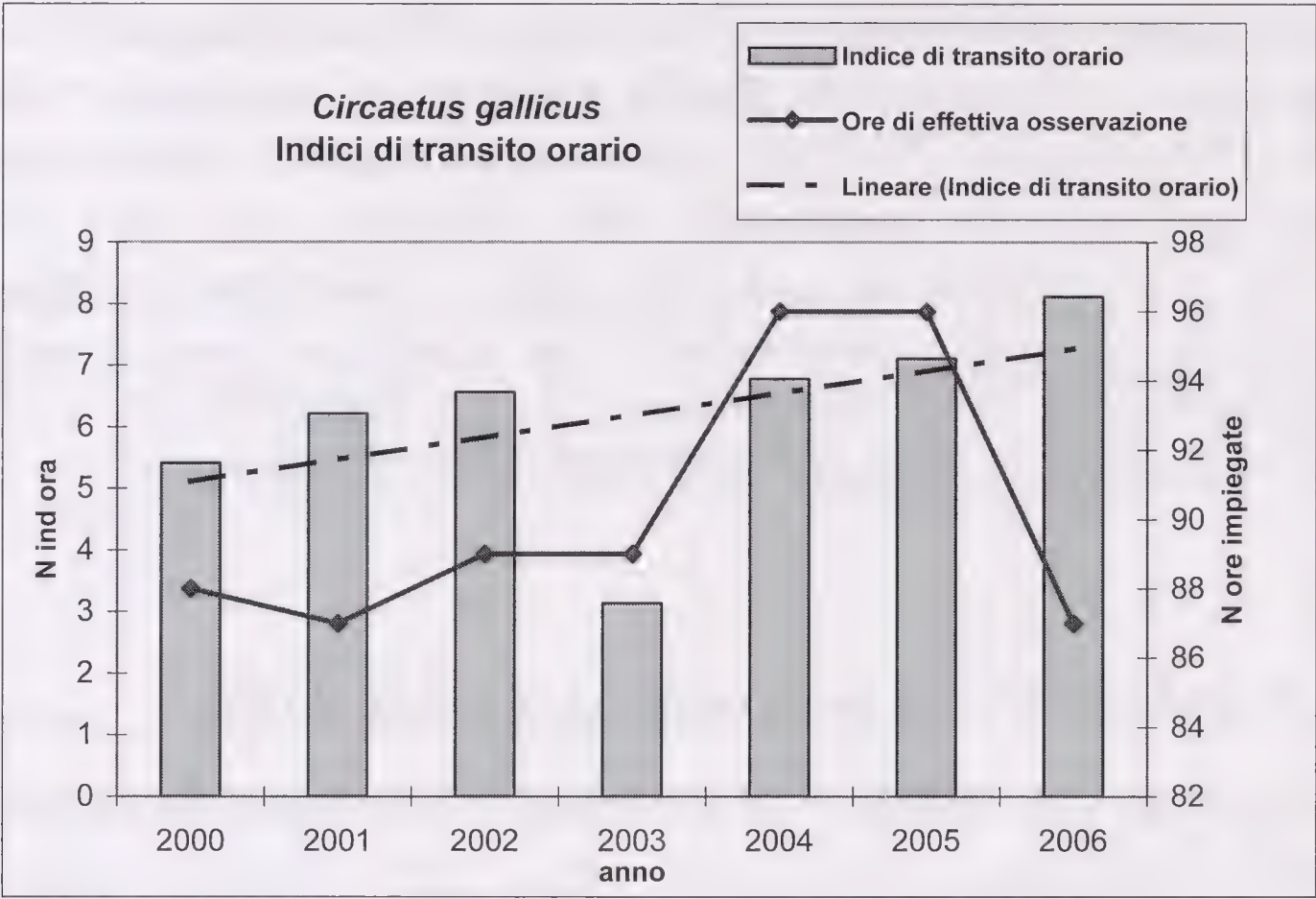


Fig. 3 - Indici di passaggio del Biancone *Circaetus gallicus*.

La data mediana di migrazione è risultata il 20 settembre. Nei periodi di campionamento il numero annuale degli individui migranti non è variato in misura statisticamente significativa (test di Kruskal-Wallis $H = 4,81$; g.l. = 6; $P > 0,05$). Solo a 1799 (45,84% del totale) individui si è potuta assegnare l'età con ragionevole certezza: 1487 (82,65%) sono risultati adulti, 52 (2,90%) immaturi e 260 (14,45%) giovani (Fig. 4).

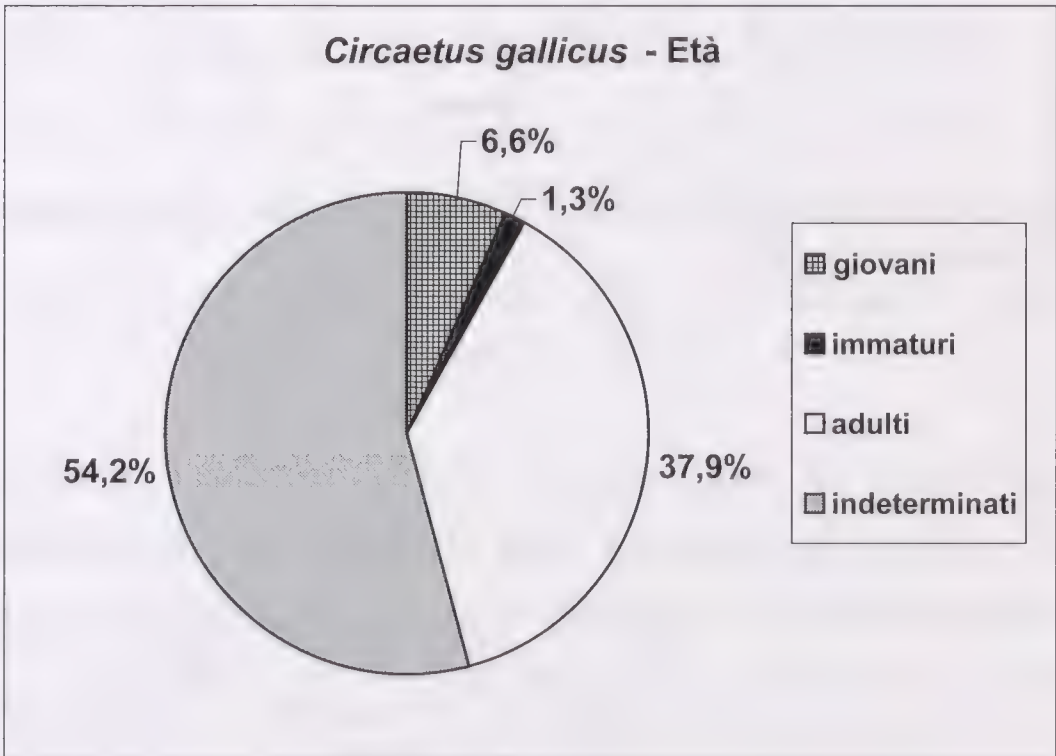


Fig. 4 - Classi di età del Biancone *Circaetus gallicus*.

Delle quattro fasce orarie di due ore, il flusso migratorio risulta maggiormente distribuito in quella dalle 11 alle 13 ($\chi^2 = 249,79$; g.l. = 6; $P < 0,05$) con il 32,8% delle osservazioni. Confrontando le mediane degli effettivi transitati nelle giornate con venti da nord (14 indd.) e con venti da sud (45 indd.), i bianconi migrano prevalentemente con venti provenienti dai quadranti meridionali (test di Mann-Whitney $U = 359$, $N_{\text{nord}} = 23$, $N_{\text{sud}} = 61$, $z = 3,43$; $P < 0,05$). Massimo conteggio: 187 indd. il 25.IX.2001.

Falco di palude *Circus aeruginosus* (Linnaeus, 1758)

Terza specie in ordine di abbondanza con indice di passaggio di 0,34 ind/h (Fig. 5).

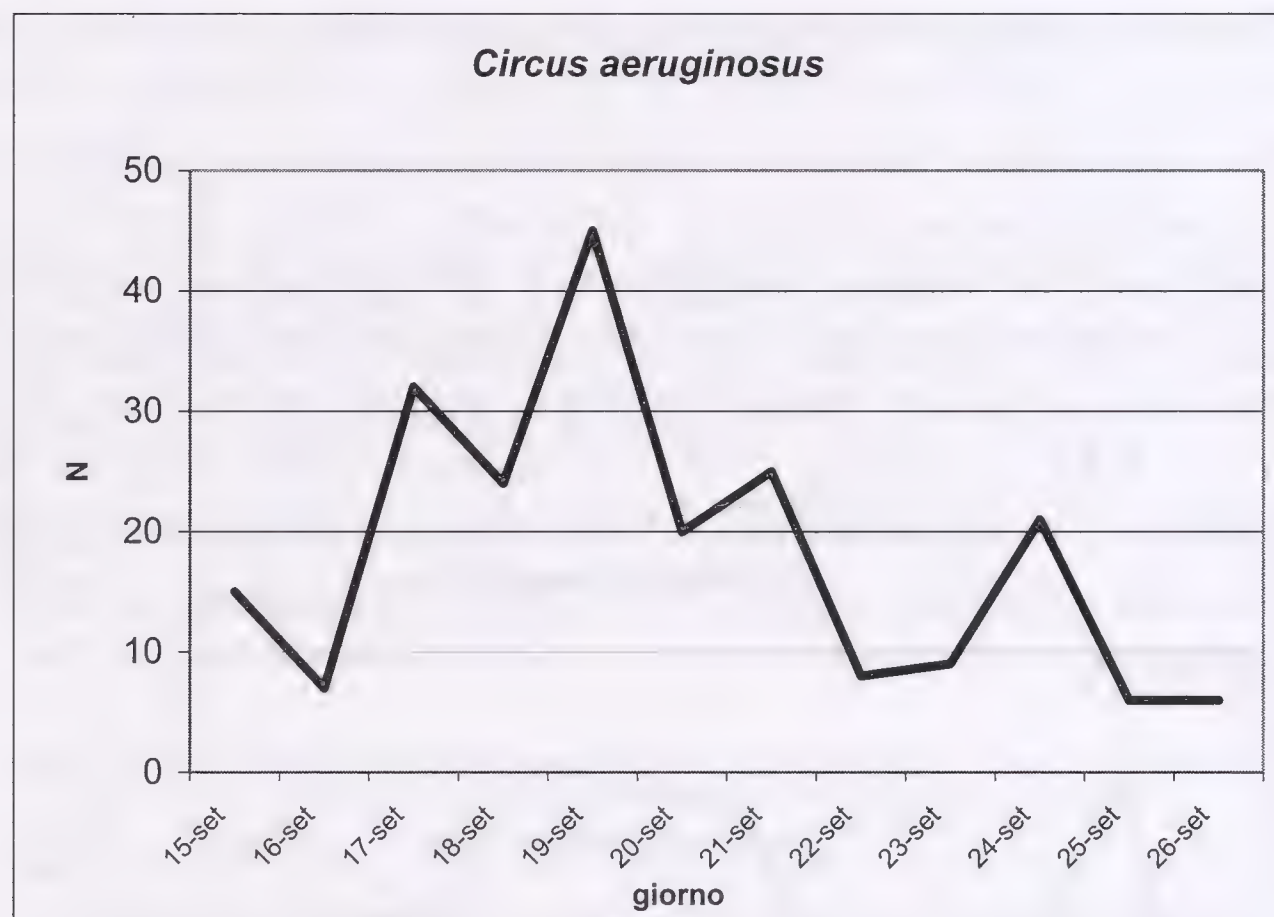


Fig. 5 - Fenologia della migrazione del Falco di palude *Circus aeruginosus* nel periodo di campionamento.

La data mediana di migrazione della specie è risultata il 20 settembre. Non è stata riscontrata una differenza statisticamente significativa tra i contingenti in migrazione nei periodi di campionamento (test di Kruskal-Wallis $H = 12,24$; g.l. = 6; $P > 0,05$).

Solo a 114 individui (52,29% del totale) si è potuta attribuire l'età con ragionevole certezza: di questi, 55 (48,24%) sono risultati

giovani o immaturi e 57 adulti: 35 ♂♂ (30,70%) e 24 ♀♀ (21,06%). Massimo conteggio: 23 indd. il 19.IX.2001.

Albanella reale *Circus cyaneus* (Linnaeus, 1766)

Una sola osservazione (1 ♀ adulta il 16.IX.2003) di questo migratore atteso in date mediamente più tardive rispetto al periodo di controllo.

Sparviere *Accipiter nisus* (Linnaeus, 1758)

Specie relativamente regolare e frequente (Fig. 6), con indice di transito pari a 0,12 ind/h. Massimo conteggio: 13 indd. il 17.IX.2002.

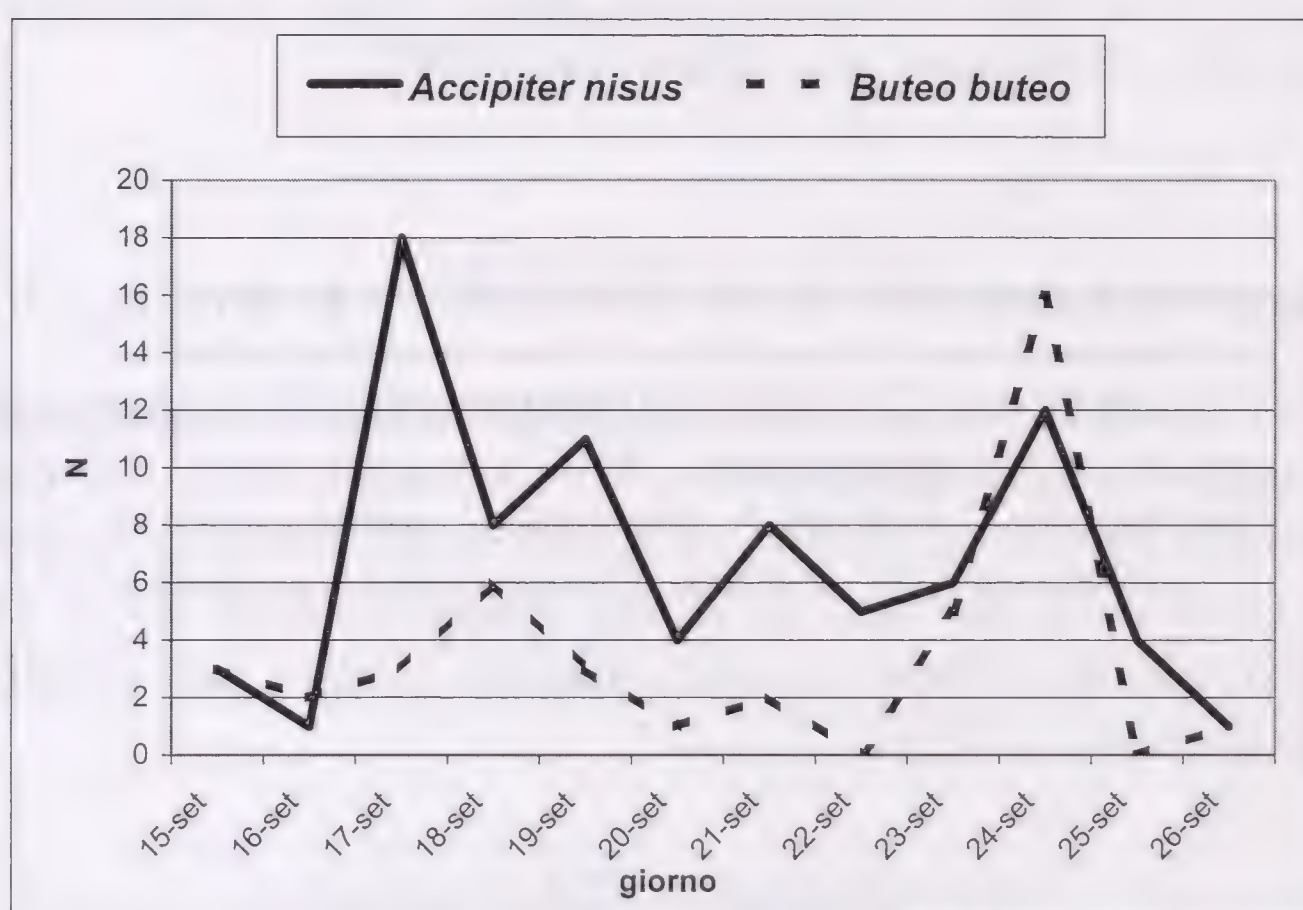


Fig. 6 - Fenologia della migrazione dello Sparviere *Accipiter nisus* e della Poiana *Buteo buteo* nel periodo di campionamento.

Poiana *Buteo b. buteo* (Linnaeus, 1758)

Poiana delle steppe *Buteo b. vulpinus* (Gloger, 1833)

Specie di comparsa regolare e piuttosto frequente (Fig. 6), con

indice di passaggio di 0,07 ind/h. Massimo conteggio (sottospecie nominale): 8 indd. il 24.IX.2005.

La forma sottospecifica *vulpinus*, la cui presenza non era stata documentata in precedenza nel sito e più in generale in Liguria, almeno in parte per probabili assegnazioni alla sottospecie nominale e soprattutto per la mancanza di veri controlli sistematici della migrazione post-riproduttiva, risulta molto scarsa e irregolare. Sono stati riconosciuti con ragionevole certezza tre soggetti con fenotipo *vulpinus* e caratteri ascrivibili al morfismo rossiccio. Massimo conteggio: 2 indd. il 17.IX.2000.

Poiana codabianca *Buteo rufinus* (Cretzschmar, 1827)

Una sola osservazione (1 juv. il 26.IX.2001) che costituisce cronologicamente la quinta segnalazione ligure dopo le quattro presenti in bibliografia, riepilogate da MINGOZZI (1987).

Aquila anatraia minore *Aquila pomarina* C. L. Brehm, 1831

Un juv. transitato il 24.IX.2005 rappresenta l'unica osservazione ligure documentata in bibliografia dalla seconda metà del diciannovesimo secolo (BAGHINO 2006): va aggiunto un maschio in pelle catturato a Genova-S.Martino d'Albaro nel novembre 1917 (MSNG 33579), periodo di comparsa relativamente tardiva per l'Italia (BRICHETTI & BENUSSI 1992).

Aquila minore *Hieraetus pennatus* (Gmelin, 1788)

Specie con indice di passaggio (Fig. 7) molto basso dal 2000 al 2004 compreso (0,01 ind/h), in notevole aumento nei due anni successivi (0,70 ind/h) per effetto di un'evidente variazione delle abbondanze, con differenze statisticamente significative (test di Kruskal-Wallis $H = 35,15$; g.l. = 6; $P < 0,05$). Massimo conteggio: 23 indd. il 23.IX.2005.

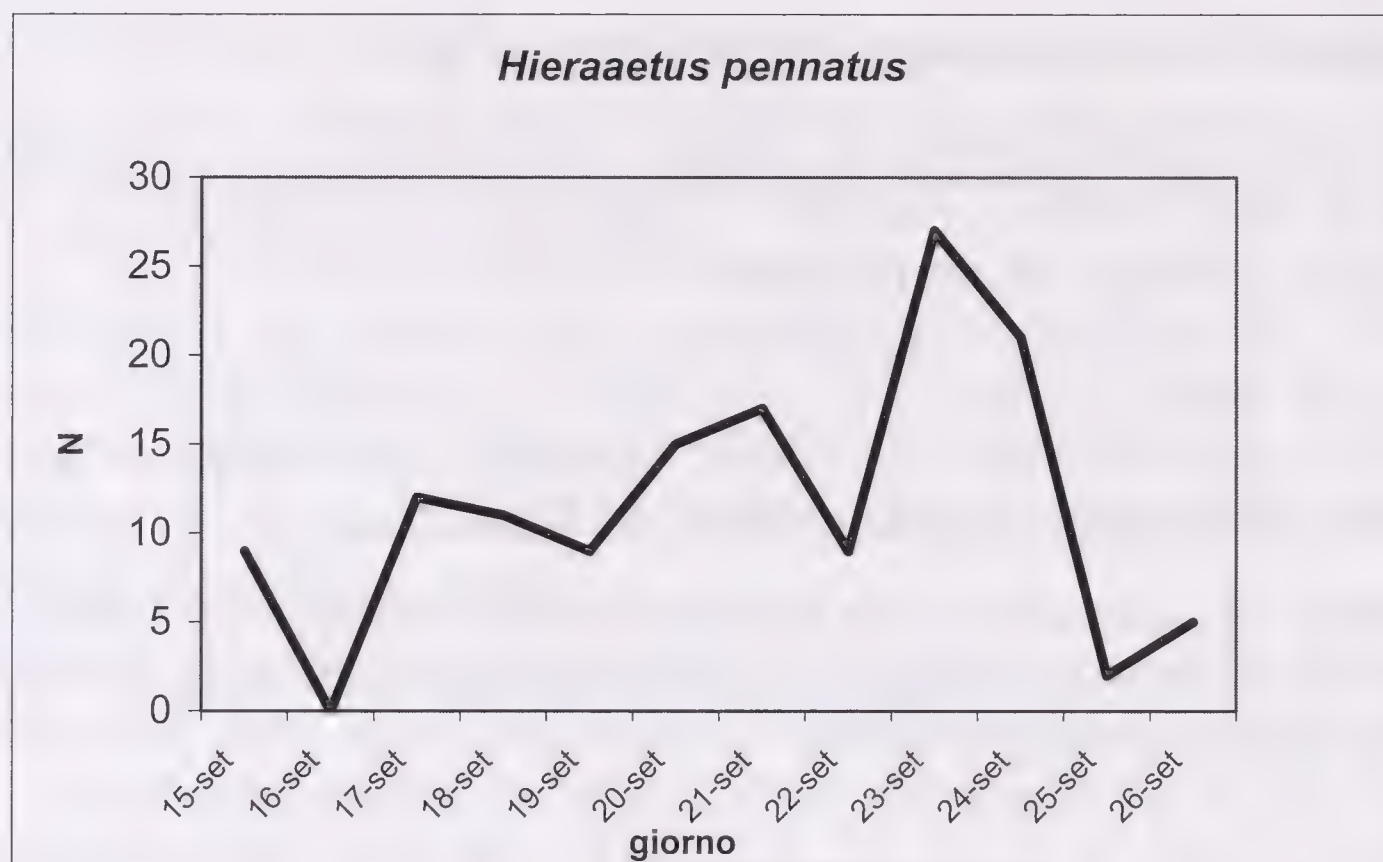


Fig. 7 - Fenologia della migrazione dell'Aquila minore *Hieraetus pennatus* nel periodo di campionamento.

Famiglia PANDIONIDAE

Falco pescatore *Pandion haliaetus* (Linnaeus, 1758)

Specie sempre poco frequente, con indice di passaggio pari a 0,02 ind/h. Massimo conteggio: 2 indd il 20.IX.2005.

Ordine FALCONIFORMES

Famiglia FALCONIDAE

Gheppio *Falco tinnunculus* (Linnaeus, 1758)

Specie di comparsa poco frequente, ma presumibilmente sotto-stimata per confusioni con i soggetti locali; indice di transito pari a 0,02 ind/h. Massimo conteggio: 2 indd. il 20.IX.2002. Vanno inoltre computati 10 individui di indeterminata attribuzione specifica tra Gheppio *Falco tinnunculus* e Grillaio *Falco naumanni*.

Smeriglio *Falco columbarius* (Linnaeus, 1758)

Due sole osservazioni di questo migratore il cui transito è da attendersi più tardivo rispetto al periodo di controllo: 1 ind. il 26.IX.2003 e 1 ind. il 19.IX.2004.

Lodolaio *Falco subbuteo* (Linnaeus, 1758)

Specie di comparsa poco frequente, con indice di transito pari a 0,03 ind/h. Massimo conteggio: 2 indd. il 21.IX.2001, il 21.IX.2005, il 25.IX.2005 e il 21.IX.2006.

Falco pellegrino *Falco peregrinus* Tunstall, 1771

Specie di comparsa molto scarsa ed irregolare con osservazioni di individui sempre singoli: tre di questi, con età e sottospecie determinate, erano adulti appartenenti alla sottospecie nominale *peregrinus*.

DISCUSSIONE

1. Rotte locali e origini presunte dei contingenti

La direzione generale dei rapaci migratori è orientata da Est-Nord-Est (75°-45°) verso Sud-Ovest (240°-245°).

Tutti i bianconi ad Arenzano seguono questa rotta parallela alla costa che, nel Ponente genovese, inizia a piegare verso Sud-Ovest.

Oltre che dal Ponente genovese in risalita dell'alto versante ligure-tirrenico (RUGGIERI *et al.* 2006), i bianconi, almeno in parte (6,67% del totale, N = 262; mediana = 40 indd./anno), sono visti pervenire anche con una provenienza più settentrionale che orientale (circa 50°), lasciando spazio all'ipotesi che dei contingenti in arrivo da aree geografiche a nord-est della Liguria e più generalmente a nord dell'Italia centrale (Appennino ligure orientale e tosco-emiliano) convergano verso la Riviera di Ponente. Tuttavia questa rotta di ingresso sul territorio con componente settentrionale tende ad essere controllata con maggior difficoltà, per la notevole quota di volo (900-1200 m) e la distanza (anche fino a 3 km) dalle postazioni più a valle: tale situazione determina il mancato avvistamento dei

soggetti in transito e la conseguente sottostima soprattutto quando la rotta tende a coincidere con la linea dello spartiacque principale o a situarsi al di là di questo (ad es. alta valle del Cerusa-Passo del Faiallo-Monte Reixa, 17.IX.2004).

Nel Falco di palude, la prevalente provenienza da Nord-Est s'inquadra nella fenologia temporale, per sesso e classi di età, dei contingenti migratori originari dei Paesi dell'Europa centro- e nord-orientale, in particolare della Repubblica Ceca (BELAUD 1993; VORIŠEK & FORMANEK 1996).

Tranne due casi registrati per il Nibbio bruno e uno per il Nibbio reale, solo le aquile minori sono state costantemente osservate in senso contrario alla migrazione prevalente, con direzione da Ovest/Sud-Ovest verso Est. Tale dato avvalora in modo considerevole l'ipotesi dell'appartenenza di questi contingenti a popolazioni dell'areale occidentale europeo di distribuzione della specie (PREMUDA & BAGHINO 2004).

2. Confronti con altri siti

E' possibile confrontare almeno in parte i dati ottenuti con quelli di alcuni tra i maggiori siti di migrazione, regolarmente monitorati, in relazione geografica con la Liguria.

a) Alpi Marittime francesi-Costa Azzurra

Nella ZPS "Beigua-Turchino" la migrazione post-riproduttiva del Biancone trova riscontri significativi e associazioni su base giornaliera con il sito delle Alpi Marittime (La Turbie-Fort de la Revère, 160 km a Sud-Ovest, percorribili ad una media di circa 5 ore di volo: BELAUD 1993), dove tuttavia gli effettivi risultano mediamente due volte inferiori (BELAUD 2003; JARDIN 2002 e 2003: Tab. II); qui, al contrario, il passaggio delle altre specie, soprattutto Falco pecchiaiolo, Falco di palude (Tab. II), Sparviere, Lodolaio e Gheppio, viene osservato con effettivi apprezzabilmente diversi (fino a 7-10 volte superiori) e senza significative correlazioni con quello della ZPS.

Tale scostamento è interpretabile nel primo caso come il mancato intercettamento, almeno in parte, del flusso del Biancone sui siti coperti, nel secondo con l'apporto di contingenti migratori pro-

venienti da settori più settentrionali (Pianura Padana occidentale e Basso Piemonte) che, non seguendo la costa della Liguria centrale, evitano di transitare sui contrafforti collinari di Arenzano.

Tab. II - Correlazioni e confronti tra gli effettivi del Falco pecchiaiolo *Pernis apivorus*, del Biancone *Circaetus gallicus* e del Falco di palude *Circus aeruginosus* in migrazione nella ZPS “Beigua-Turchino” e nel sito del Fort de la Revère (Alpi Marittime francesi-Costa Azzurra) dal 15 al 26 settembre del 2001, 2002 e 2003 (dati: Belaud, *in litt.*; JARDIN 2002 e 2003; N₁ = totale dei tre anni nella ZPS Beigua-Turchino, N₂ = totale dei tre anni nel sito del Fort de la Revère).

	2001	2002	2003
<i>Pernis apivorus</i> N ₁ = 145; N ₂ = 1798	Test di Spearman <i>r_s</i> , N.S.	Test di Spearman <i>r_s</i> , N.S.	Test di Spearman <i>r_s</i> = 0,62, N = 12, P<0,05
	Test di Wilcoxon <i>t</i> = 2,9, P<0,01	Test di Wilcoxon <i>t</i> = 3,1, P<0,01	Test di Wilcoxon <i>t</i> = 2,8, P<0,01
<i>Circaetus gallicus</i> N ₁ = 1407; N ₂ = 507	Test di Spearman <i>r_s</i> = 0,92, N=12, P<0,01	Test di Spearman <i>r_s</i> = 0,85, N= 12, P<0,01	Test di Spearman <i>r_s</i> = 0,68, N=12, P=0,01
	Test di Wilcoxon <i>t</i> = 2,4, P<0,02	Test di Wilcoxon <i>t</i> = 3,1, P<0,01	Test di Wilcoxon <i>t</i> = 3, P<0,01
<i>Circus aeruginosus</i> N ₁ = 90; N ₂ = 626	Test di Spearman <i>r_s</i> , N.S.	Test di Spearman <i>r_s</i> , N.S.	Test di Spearman <i>r_s</i> , N.S.
	Test di Wilcoxon <i>t</i> = 2,8, P<0,01	Test di Wilcoxon <i>t</i> = 2,9, P<0,01	Test di Wilcoxon <i>t</i> = 2,8, P<0,01

b) Alpi Marittime cuneesi (Valle Stura).

La migrazione del Biancone risulta ogni anno di norma inferiore (1129 indd. dal 1991 al 2000: BELAUD, GIRAUDO & TOFFOLI 2001); molto più importante è quella del Falco pecchiaiolo che fa registrare uno o più picchi massimi tra il 25 agosto e il 5 settembre (TOFFOLI 2000, 2001 e 2003; GIRAUDO 2004; GIRAUDO & TOFFOLI 2002 e 2005) ed una netta flessione nelle settimane successive attestandosi su valori confrontabili con quelli di Arenzano nel periodo di riferimento.

c) Alpi Apuane (LU)

Sito in relazione migratoria ben documentata (RUGGIERI *et al.* 2006), anche attraverso analoghi e simultanei periodi di controllo nel

2001 (AGOSTINI *et al.* 2002a) e 2006 (PREMUDA 2006), relativamente alla risalita della costa tirrenica da parte del Biancone secondo lo schema “a circuito”.

d) Isola di Pianosa (LI):

Sito interessato da parziali controlli contemporanei (relativamente agli anni 2001, 2002, 2003, 2004, 2005 con archi di copertura temporale di diversa estensione) che mostrano flussi più intensi di falchi di palude, falchi pecchiaioli e gheppi (PAESANI & POLITI 2002, 2003a e 2003b, 2004, 2005).

Per i Colli Asolani (TV) (MEZZAVILLA, MARTIGNAGO & SILVERI 2001; MEZZAVILLA, MARTIGNAGO & SILVERI 2003; MEZZAVILLA *et al.* 2002, 2003, 2004, 2005 e 2006) e le Colline moreniche gardesane (BS-MN-VR) (GARGIONI 2002, 2003, 2004, 2005 e 2006), siti di primaria importanza per la migrazione del Falco pecchiaiolo in Italia, non è possibile effettuare confronti in quanto i controlli sono anticipati e conclusi entro la prima decade di settembre, mostrando notevoli concentrazioni di flussi migratori tra il 20 e il 30 agosto. Analoghe considerazioni valgono per l'isola d'Elba interessata da osservazioni preliminari sulla migrazione autunnale dei rapaci condotte dal 6 al 12 Settembre 2004 con prevalenza di falchi di palude e falchi pecchiaioli, allineate in generale con le risultanze dell'isola di Pianosa (PREMUDA, PAESANI & COCCHI 2005), ma con più significativi contingenti di sparvieri (PAESANI & VANNI 2006).

3 Analisi per specie

La ZPS “Beigua-Turchino” risulta eminentemente qualificata dalla concentrazione dei flussi migratori degli Accipitriformes e dei Falconiformes (GALLI, ALUIGI & BAGHINO 2006): per alcune specie è possibile delineare determinati aspetti riguardanti gli schemi migratori.

Falco pecchiaiolo *Pernis apivorus* (Linnaeus, 1758)

L'attuazione del monitoraggio, centrato attorno al picco della migrazione del Biancone, in un periodo tardivo rispetto ai mas-

simi passaggi del Falco pecchiaiolo rilevati nell'Italia settentrionale (TOFFOLI & BELLONE 1996; MEZZAVILLA, MARTIGNAGO & SILVERI 2003), definisce per questa specie un transito di dimensione piuttosto contenuta e a prevalenza di soggetti giovani, analogamente a quanto riscontrato nell'Italia meridionale durante la seconda metà di settembre (AGOSTINI & LOGOZZO 1997; AGOSTINI *et al.* 1999).

Biancone *Circaetus gallicus* (Gmelin, 1788)

I risultati qui presentati documentano l'esistenza di un flusso migratorio post-riproduttivo notevole per dimensione, confrontabile come ordine di grandezza con quello primaverile (BAGHINO 2003); a livello nazionale, il sito di Arenzano risulta il secondo in ordine di importanza dopo il Monte Colegno (Alpi Apuane, LU) e prima delle Alpi Marittime (Valle Stura di Demonte, CN) in un periodo di tre giorni consecutivi dell'ultima decade di settembre disposti a ridosso del picco migratorio autunnale (RUGGIERI *et al.* 2006). Questo lavoro condotto dal 2000 al 2004 in vari siti della Penisola Italiana, oltre a documentare lo schema della migrazione "a circuito" attuata dalla specie in risalita della Penisola italiana, evidenzia in particolare una più marcata proporzione dei non adulti (20% costituito da giovani e 10% da immaturi) rispetto a quella osservata ad Arenzano: la ripartizione delle età in un simultaneo periodo di controllo nel 2001 risulta assai simile a quella di Monte Colegno (78% adulti-16% giovani-6% immaturi: AGOSTINI *et al.* 2004).

L'indice medio di passaggio ottenuto nei sette anni ad Arenzano è dipendente dalla maggior estensione dell'arco temporale controllato (12 giorni contro una finestra temporale di soli 3) e dall'inclusione in essa di periodi non coincidenti o immediatamente contigui con il picco della migrazione post-nuziale che determina indici più alti (RUGGIERI *et al.* 2006): esso risulta sensibilmente maggiore di quello rilevato nelle Alpi Marittime dal 1991 al 2000 (0,44 ind/h: BELAUD, GIRAUDO & TOFFOLI 2001) e nel 2001 (TOFFOLI 2001).

Lo scarso numero di individui censiti nel 2003 rispecchia l'anomalo andamento generale della migrazione dei Rapaci registrato quell'anno nella maggior parte dei siti monitorati dell'Italia settentrionale (PAESANI & POLITI 2003; TOFFOLI 2003) e della vicina

Francia (JARDIN 2003) e genericamente attribuito alle eccezionali condizioni meteo-climatiche con alte temperature.

Falco di palude *Circus aeruginosus* (Linnaeus, 1758)

Sparviere *Accipiter nisus* (Linnaeus, 1758)

Per queste specie l'inferiore consistenza numerica dei contingenti di passo rispetto ad aree geografiche vicine (Alpi Marittime francesi: JARDIN 2002 e 2003; Isola di Pianosa: PAESANI & POLITI 2002, 2003 e 2004) pare attribuibile ad uno schema migratorio, ancora incerto e da definire nella sua fenologia, che escluderebbe, limitatamente al periodo controllato, i contrafforti collinari di Arenzano dalle rotte principali attraverso l'alto versante ligure-tirrenico; queste, presumibilmente confluenti nel Ponente Ligure dal lato settentrionale dello spartiacque principale, paiono interessare maggiormente le Alpi Marittime, mentre, più a sud, una distinta direttrice migratoria affluisce sull'Arcipelago Toscano verso il ponte Sardo-Corso.

Poiana delle steppe *Buteo buteo vulpinus* (Gloger, 1833)

La direzione comune e l'imbrancamento con piccoli gruppi di falchi pecchiaioli di alcuni degli individui attribuiti alla sottospecie *vulpinus* (da considerarsi ormai non più accidentale ma migratrice e svernante regolare per l'Italia: CORSO 1999) potrebbero riferirsi a soggetti appartenenti a popolazioni dell'Europa orientale in movimento attraverso la penisola italiana verso areali di svernamento (CORSO 2002).

Aquila minore *Hieraetus pennatus* (Gmelin, 1788)

Il quadro delle conoscenze sulla migrazione post-riproduttiva della specie in Italia, recentemente aggiornato (PREMUDA & BAGHINO 2004) è stato di fatto sconvolto dallo straordinario caso di migrazione di massa di aquile minori avvenuto nell'Ottobre del 2004 che ha coinvolto nell'arco di dieci giorni oltre 500 individui in ingresso dalla Francia (BAGHINO 2005; BAGHINO & PREMUDA 2005). La feno-

logia dei contingenti (Fig. 8) appare in relazione con lo straordinario fenomeno osservato nel 2004 e con i successivi movimenti migratori da questo derivati (BAGHINO *et al.* in pubbl.), facendo della ZPS “Beigua-Turchino” uno dei siti di maggior concentrazione del flusso migratorio finora noti in Italia.

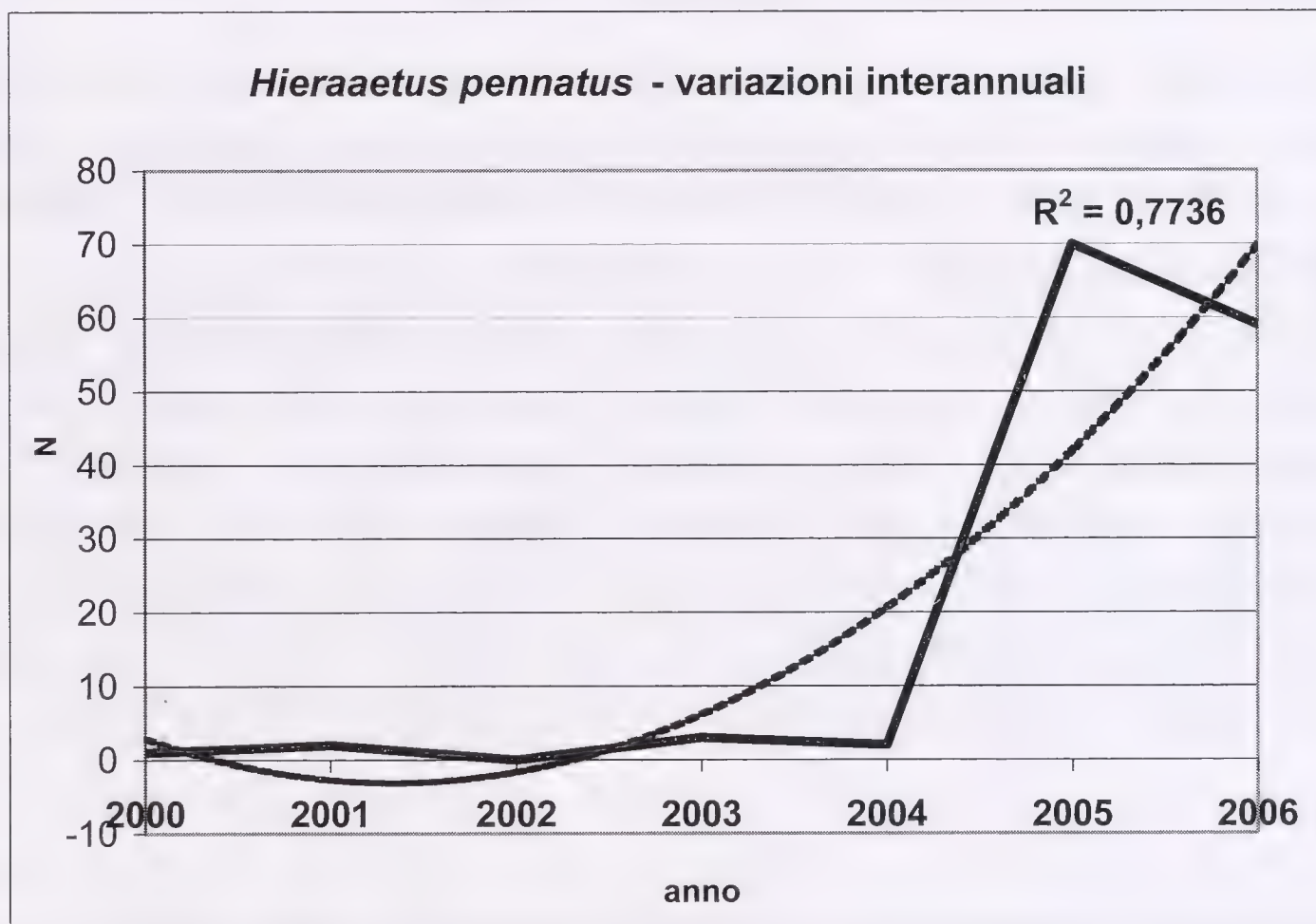


Fig. 8 - Variazioni interannuali di abbondanza dell'Aquila minore *Hieraetus pennatus* nel periodo di campionamento con linea di tendenza polinomiale.

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BIBLIOGRAFIA

- AGOSTINI N., BAGHINO L., COLEIRO C., CORBI F. & PREMUDA G., 2002a - Circuitous autumn migration in the Short-toed Eagle (*Circaetus gallicus*) - *J. Raptor Res.*, West Chester, OH, USA, 36 (2): 111-114.
- AGOSTINI N., BAGHINO L., PANUCCIO M. & PREMUDA G., 2002b - A conservative strategy in migrating Short-toed Eagles (*Circaetus gallicus*) - *Ardeola*, Madrid, 49 (2): 287-291.
- AGOSTINI N., BAGHINO L., PANUCCIO M., PREMUDA G. & PROVENZA A., 2004 - The autumn migration strategies of adult and juvenile short-toed eagles *Circaetus gallicus* in the central Mediterranean - *Avocetta*, Pavia, 28: 37-40.
- AGOSTINI N. & LOGOZZO D., 1997 - Autumn migration of Accipitriformes through Italy en route to Africa - *Avocetta*, Pavia, 21: 174-179.
- AGOSTINI N., LOGOZZO D. & COLEIRO C., 1999 - The orientation/navigation hypothesis: an indirect evidence in migrating Honey Buzzards - *Riv. ital. Orn.*, Milano, 69: 153-159.
- BAGHINO L., 1996 - The spring migration of raptors over a site of western Liguria: results 1985 to 1994 (pp.387-391) - In: Muntaner J. & Mayol J. (Eds.): *Biología y Conservación de las Rapaces Mediterráneas*, 1994. Monografías, n.4, SEO, Madrid, 488 pp.
- BAGHINO L., 2003 - L'importanza del Ponente genovese per la migrazione del Biancone *Circaetus gallicus* - *Avocetta*, Pavia, 27: 67.
- BAGHINO L., 2005 - Un caso di migrazione di massa nell'Aquila minore *Hieraetus pennatus* in Liguria - *Il Biancone*, Genova, s.n.: 19-22.
- BAGHINO L., 2006 - Osservazione di Aquila anatraia minore *Aquila pomarina* nel Ponente genovese - *Il Biancone*, Genova, 1: 14-16.
- BAGHINO L. & LEUGIO N., 1989 - La migration printanière des Rapaces à Arenzano (Genes-Italie) - *Nos Oiseaux*, Genève, 416 (40): 2.
- BAGHINO L. & LEUGIO N., 1990 - La migrazione prenuziale degli *Accipitriformes* e dei *Falconiformes* in un sito della Liguria occidentale - *Avocetta*, Pavia, 14: 47-57.
- BAGHINO L. & PREMUDA G., 2005 - Autunno 2004: eccezionale invasione di aquile minori - *Quaderni di Birdwatching*, 13, EBN Italia Edizioni, Verona, CD-Rom.
- BAGHINO L., PREMUDA G., GUSTIN M., CORSO A., MELLONE U. & CARDELLI C., in pubbl. - Exceptional wintering and spring migration of the booted eagle *Hieraetus pennatus* in Italy in 2004 and 2005 - *Avocetta*, Pavia.
- BELAUD M., 1993 - La migration des rapaces dans les Alpes Maritimes. Synthèse de 1981 à 1992 - *Faune de Provence (CEEP)*, Aix-en-Provence, 14: 27-45
- BELAUD M., 2003 - Migrations printanière et automnale du Circaète Jean-le-Blanc *Circaetus gallicus* dans les Alpes Maritimes. Voies migratoires locales et phénologies - *Faune de Provence (CEEP)*, Aix-en-Provence, 21: 53-60.
- BELAUD M., GIRAUDO L. & TOFFOLI R., 2001 - La migrazione postnuziale del Biancone *Circaetus gallicus* attraverso le Alpi Marittime - *Avocetta*, Pavia, 25: 46 (2001)
- BRICHETTI P. & BENUSSI E., 1992 - Aquila anatraia minore *Aquila pomarina* - In: Brichetti P. et al. (eds.) - *Fauna d'Italia. XXIX. Aves. I*. Edizioni Calderini, Bologna: 589-593.

- BRICHETTI P. & MASSA B., 1998 - Check-list degli uccelli italiani aggiornata a tutto il 1997 - *Riv. ital. Orn.*, Milano, 68: 171-231.
- CLARK W.S., 2003 - Guida ai Rapaci d'Europa, Nord Africa, Medio Oriente - Muzzio Ed., Padova, 387 pp.
- CORSO A., 1999 - Dati sulla migrazione della Poiana delle steppe *Buteo buteo vulpinus* in Italia - *Alula*, Roma, 6 (1,2): 125-130.
- CORSO A., 2002 - Nuovi dati sulla migrazione della Poiana delle steppe *Buteo buteo vulpinus* in Italia e in Europa - *Alula*, Roma, 9 (1,2): 105-108.
- FORSMAN D., 1999 - The Raptors of Europe and the Middle East - Ed. T&AD Poyser, London, 590 pp.
- GALLI L., ALUIGI A. & BAGHINO L., 2006 - Guida agli uccelli della ZPS "Beigua-Turchino" e del Parco del Beigua - Parco del Beigua, Savona, 358 pp.
- GARGIONI A., 2002 - Colline moreniche del Garda (BS-MN). Censimento autunnale Pecchiaiolo 2002 - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 10.
- GARGIONI A., 2003 - La migrazione dei rapaci sulle colline moreniche del Garda (BS-MN-VR) Lombardia - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 12.
- GARGIONI A., 2004 - La migrazione dei rapaci sulle colline moreniche del Garda (BS-MN-VR) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 14.
- GARGIONI A., 2005 - La migrazione dei rapaci sulle colline moreniche del Garda (BS-MN-VR) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 16.
- GARGIONI A., 2006 - La migrazione dei rapaci sulle colline moreniche del Garda (BS-MN-VR) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 18.
- GIRAUDO L., 2004 - La migrazione post-riproduttiva in Valle Stura (Demonte - CN) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 14.
- GIRAUDO L. & TOFFOLI R., 2002 - La migrazione postnuziale nelle Alpi Marittime (CN) - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 10.
- GIRAUDO L. & TOFFOLI R., 2005 - La migrazione post-riproduttiva in Valle Stura (Demonte - CN) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 16.
- JARDIN M., 2002 - La migration post-nuptiale des oiseaux au Fort de la Revère en 2002 (Eze La Turbie, Alpes-Maritimes) - Rapport LPO-PACA, Hyères-les-Palmiers: 77 pp.
- JARDIN M., 2003 - La migration post-nuptiale des oiseaux au Fort de la Revère en 2003 (Eze La Turbie, Alpes-Maritimes) - Rapport LPO-PACA, Hyères-les-Palmiers: 57 pp.
- MEZZAVILLA F., MARTIGNAGO G., PICCOLO F. & SILVERI G., 2003 - La migrazione post-riproduttiva dei rapaci sopra i Colli Asolani (TV) Veneto - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 12.
- MEZZAVILLA F., MARTIGNAGO G., PICCOLO F. & SILVERI G., 2004 - La migrazione post-riproduttiva dei rapaci sopra i Colli Asolani (Maser-TV) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 14.
- MEZZAVILLA F., MARTIGNAGO G. & SILVERI G., 2001 - La migrazione dei rapaci in provincia di Treviso (Colli Asolani-Maser) - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 8.
- MEZZAVILLA F., MARTIGNAGO G. & SILVERI G., 2003 - Migrazione visibile post-riproduttiva del Falco pecchiaiolo *Pernis apivorus* sopra i Colli Asolani (NE Italia): anni 1994-2001 - *Avocetta*, Pavia, 27: 52-56.

- MEZZAVILLA F., MARTIGNAGO G., SILVERI G. & PICCOLO F., 2002 - La migrazione post-riproduttiva dei rapaci sopra i Colli Asolani (Maser-Treviso) - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 10.
- MEZZAVILLA F., MARTIGNAGO G., SILVERI G. & PICCOLO F., 2005 - La migrazione post-riproduttiva dei rapaci sopra i Colli Asolani - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 16.
- MEZZAVILLA F., MARTIGNAGO G., SILVERI G. & PICCOLO F., 2006 - La migrazione post-riproduttiva dei rapaci sui Colli Asolani (TV) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 18.
- MINGOZZI T., 1987 - Revisione critica delle segnalazioni italiane di Poiana coda-bianca (*Buteo rufinus* CR.). In: Baccetti N. & Spagnesi M. (a cura di), Rapaci mediterranei III - *Suppl. Ric. Biol. Selv.*, Ozzano nell'Emilia, 12: 155-167.
- PAESANI G. & POLITI P., 2002 - Monitoraggio della migrazione autunnale dei rapaci diurni nell'isola di Pianosa (LI). Parco Nazionale Arcipelago Toscano - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 10.
- PAESANI G. & POLITI P., 2003a - Prime osservazioni sulla migrazione autunnale dei rapaci diurni sull'isola di Pianosa nel Parco Nazionale Arcipelago Toscano - Campi WWF Toscana - settembre 2001 - *Avocetta*, Pavia, 27: 71.
- PAESANI G. & POLITI P., 2003b - La migrazione autunnale dei rapaci sull'isola di Pianosa (LI) Parco Nazionale Arcipelago Toscano - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 12.
- PAESANI G. & POLITI P., 2004 - La migrazione autunnale dei rapaci sull'isola di Pianosa (LI) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 14.
- PAESANI G. & POLITI P., 2005 - La migrazione post-riproduttiva dei rapaci diurni nel Parco Nazionale dell'Arcipelago Toscano (LI) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 16.
- PAESANI G. & VANNI L., 2006 - La migrazione post-riproduttiva dei rapaci sull'isola d'Elba (LI) - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 18.
- PREMUDA G., 2006 - La migrazione dei rapaci sulle Alpi Apuane (LU): campi autunno 2006 - *Info Migrans*, Parco Naturale Alpi Marittime, Valdieri: 18.
- PREMUDA G. & BAGHINO L., 2004 - La migrazione autunnale dell'Aquila minore *Hieraetus pennatus* attraverso la penisola italiana - *Riv. ital. Orn.*, Milano, 74 (2): 103-115.
- PREMUDA G., PAESANI G. & COCCHI L., 2005 - Osservazioni preliminari sulla migrazione autunnale dei rapaci sull'isola d'Elba - *Riv. ital. Orn.*, Milano, 75 (1): 31-36.
- RUGGIERI L., PREMUDA G., BAGHINO L. & GIRAUDO L., 2006 - Esperienza di monitoraggio su vasta scala della migrazione autunnale del biancone *Circaetus galli-cus* in Italia e nel Mediterraneo centrale - *Avocetta*, Pavia, 30: 76-80.
- TOFFOLI R., 2000 - Parco Naturale Alpi Marittime - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 6.
- TOFFOLI R., 2001 - Parco Naturale Alpi Marittime - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 8.
- TOFFOLI R., 2003 - La migrazione dei rapaci in Valle Stura di Demonte (CN) Piemonte - *Informamigrans*, Parco Naturale Alpi Marittime, Valdieri: 12.
- TOFFOLI R. & BELLONE C., 1996 - Osservazioni sulla migrazione autunnale dei rapaci diurni sulle Alpi Marittime - *Avocetta*, Pavia, 20: 7-11.

- VORIŠEK P. & FORMANEK J., 1996 - The analysis of ringing recoveries of four Czech raptor species from the Mediterranean area (pp. 381-385) - In: Muntaner J. & Mayol J. (Eds.): *Biología y Conservación de las Rapaces Mediterráneas*, 1994. Monografías, n.4, SEO, Madrid, 488 pp.
- ZALLES J. & BILDSTEIN K., 2000 - Raptor watch: a global directory of raptor migration sites - Cambridge UK: BirdLife International and Kempton, PA, USA: Hawk Mountain Sanctuary, BirdLife Conservation Series No. 9, 419 pp.

RIASSUNTO

In questo lavoro sono presentati i risultati di un monitoraggio della migrazione post-riproduttiva dei rapaci diurni, avente come specie target il Biancone *Circaetus gallicus*, ed effettuato con analoghe modalità per sette anni consecutivi (dal 2000 al 2006) in un'area del Ponente Genovese (Arenzano) compresa nel Parco Naturale del Beigua e nella Zona di Protezione Speciale IT 1331578 (*sensu* Dir. 79/409/CEE "Uccelli") "Beigua-Turchino".

Sebbene alcuni aspetti relativi soprattutto al comportamento e allo schema migratorio autunnale del Biancone attraverso la penisola italiana siano già stati affrontati, scopo di questa indagine è documentare il volume e la fenologia della migrazione dei Rapaci attraverso una finestra temporale di dodici giorni (15-26 Settembre) nel sito di Arenzano, già noto per la concentrazione dei flussi migratori in stagione pre-riproduttiva. In totale sono stati censiti 4907 individui appartenenti a 12 specie di Accipitriformes e a 4 di Falconiformes.

ABSTRACT

Survey of the post-reproductive migration of diurnal raptors in the Special Protection Area IT 1331578 "Beigua-Turchino" (Aves, Accipitriformes et Falconiformes).

This paper reviews the results of a raptor migration survey, setting the Short-toed Eagle *Circaetus gallicus* as the target species, that has been carried out yearly from 2000 to 2006 using the same standardized methods and observation protocols at the mountain site of Arenzano (25 km west of Genoa, Liguria): this is included in the Beigua Natural Park and in a Special Protection Area (*ex* Directive 79/409/CEE "Birds") named "Beigua-Turchino".

Although some matters regarding mainly the Short-toed Eagle's migrating behaviour and strategies through the Italian Peninsula have been already dealt with, this study aims to document both the raptor migration volume and the species phenology across a species-specific, 12-day sampling period in the second half of September. An overall number of 4,907 migrating raptors belonging to 16 species were counted at this site which was already known because of its raptor migration importance during spring.

RES LIGUSTICAE CCLIV

DAVIDE BADANO*

CONTRIBUTO ALLA CONOSCENZA DEI NEUROTTERI
DELLA LIGURIA

(INSECTA, NEUROPTERIDA)

Lo stato di conoscenza dei Neurotteri s. l. italiani è piuttosto eterogeneo, specialmente per gli aspetti corologici (LETARDI 1998 e 2004). In alcune aree (quali determinati settori delle Alpi e delle Prealpi, l'Emilia-Romagna, la Sardegna e vari parchi naturali dell'Italia centrale e meridionale) si è concentrata l'attività di ricerca dei neurotterologi mentre altre sono poco conosciute ed oggetto solo di segnalazioni occasionali (LETARDI 1998 e 2005).

La Liguria rientra fra le regioni in cui non sono state effettuate specifiche campagne di ricerca, per cui i pochi dati disponibili riguardano per lo più specie comuni e ad ampia distribuzione, si riferiscono a poche località ed in molti casi sono anche piuttosto datati.

Allo scopo di incrementare le nostre conoscenze sulla neurottero-fauna ligure, rendo qui noti una serie di reperti da me effettuati durante lo svolgimento della mia tesi di laurea triennale in Scienze Naturali, sostenuta nel 2006 presso l'Università di Genova.

AREA DI STUDIO E METODI

I campionamenti sono stati effettuati, da maggio ad agosto 2006, nelle stazioni sotto indicate, poste nell'estremo ponente ligure, nei territori di vari comuni, tutti facenti parte della Provincia di Imperia. L'unica eccezione è costituita dalla stazione di Sassello, situata in Provincia di Savona.

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Perinaldo (IM)

Area posta in prossimità dello spartiacque tra la Valle Verbone e la Val Nervia. Le catture (sia diurne che notturne) sono state effettuate in località “Bana-Trumè” (560 m s.l.m.) e “Monte Rebuffao” (590 m s.l.m.), in un ambiente di tipo mediterraneo che sul versante est è particolarmente xerico (oliveti e gariga bassa arbustivo-erbacea con prevalenza di *Cistus* spp.), mentre su quello ovest presenta condizioni meno severe, che consentono lo sviluppo di un bosco misto di latifoglie e, in alcuni punti, di sclerofille.

San Biagio della Cima (IM)

Zona collinare, posta sul versante sinistro della valle del torrente Verbone. Le catture (soltanto notturne) sono state effettuate in località “Madonna dell’Annunciata”, a circa 220 m s.l.m.; gran parte dell’area è occupata da oliveti; la vegetazione spontanea è costituita da boschi misti di latifoglie con prevalenza di *Quercus pubescens* Willd..

Castellaro (IM)

Zona collinare, situata in Valle Argentina. L’area prescelta per le catture (solo diurne) è ubicata in località “Santuario di Lampedusa” ad un’altitudine di 370 m s.l.m., in un versante collinare di accentuata acclività esposto prevalentemente a sud/ovest, che nella parte inferiore presenta una vegetazione costituita da un’alternanza di boschi misti di latifoglie termofile, mentre in quella superiore, più esposta e xerica, predominano formazioni arbustive ed erbacee.

Val Nervia (IM)

Nell’area sono stati effettuati una serie di campionamenti diurni, salendo progressivamente d’altitudine, fino a giungere nelle immediate vicinanze del “Passo Muratone”, a ridosso del confine con la Francia a 1.158 m slm.; tale località, caratterizzata da un’accentuata acclività, si trova al limitare della vegetazione arborea.

Un ulteriore campionamento è stato eseguito lungo le pendici del Monte Pietravecchia e del Monte Toraggio, percorrendo il “Sentiero degli Alpini” (Colla Melosa 1.545 m slm. – Gola dell’Incisa 1.685 m slm. – Passo di Fonte Dragurina 1.810 m slm.), zona tipicamente montana con versante in forte acclività e con affioramenti rocciosi.

La vegetazione è costituita da boschi di *Larix decidua* Miller nel tratto iniziale, arbustiva con alberi sparsi nel tratto mediano, per giungere ad una prateria alpina alle pendici del Monte Toraggio.



Fig. 1 - Siti di cattura in provincia di Imperia.

Sassello (SV)

Le ricerche sono state effettuate nella località "Rocche dell'Erro", a circa 330 m s.l.m., in un ambiente costituito da un bosco ceduo misto di latifoglie, con prevalenza di *Quercus petrea* (Mattuschka) Liebl., con versanti circostanti a *Pinus* spp.; le catture, sia diurne che notturne, sono state concentrate lungo i margini boschivi.

Infine, si sono svolte raccolte sporadiche nelle seguenti località: Colle di Nava (941 m s.l.m.), Andagna-Drego (715-1016 m s.l.m.), Aigovo (681 m s.l.m.) e Bordighera, Vallone del Sasso (ca. 50 m s.l.m.), tutte in Prov. di Imperia, e alla confluenza tra il Rio Arvigo ed il Rio Canate, Davagna, in Prov. di Genova.

Le catture diurne sono state effettuate con l'uso del retino entomologico, mentre per quelle notturne si è utilizzata una trappola luminosa, costruita secondo le modalità descritte da PARENZAN & DE MARZO (1981) e BERIO (1985); come sorgente luminosa è stato impiegato un neon U.V.A. da 15 Watt.

RISULTATI

Per ogni specie sono indicati i siti di cattura, la categoria corologica, la distribuzione in Italia (tratta da LETARDI & PANTALEONI 1996 e LETARDI 2005) e le precedenti citazioni per la Liguria. Se non indicato diversamente, gli esemplari sono stati raccolti dall'autore.

Megaloptera

Sialidae

Sialis fuliginosa Pictet, 1836

Confluenza tra il Rio Arvigo ed il Rio Canate, Davagna (GE), 26.V.2006 (1 larva).

Specie sibirico-europea, segnalata per gran parte delle regioni italiane e già nota per l'area in esame (NAVÁS 1928, LETARDI 1994). Non trattandosi di una larva all'ultimo stadio, l'identificazione ha un piccolo margine di dubbio.

Raphidioptera

Raphidiidae

Dichrostigma flavipes (Stein, 1863)

Sassello (SV), 15.VI.2006 (2 ♀♀).

Specie a distribuzione centroeuropea, presente in Italia nelle regioni dell'arco alpino ed in alcune aree dell'Appennino settentrionale; già segnalata per la Liguria da CASTELLANI (1957).

Ornatoraphidia flavilabris (Costa, 1855)

Monte Toraggio (IM), 27.VI.2006 (1 ♂).

Specie a distribuzione sudeuropea; presente lungo l'Appennino, è nota anche per le Alpi Marittime francesi. Prima segnalazione per la Liguria.

Xanthostigma aloysiana (Costa, 1855)

Perinaldo (IM), 8.VII.2006, trappola luminosa (1 ♀).

Specie a distribuzione W-mediterranea, che in Italia è conosciuta per le regioni appenniniche; prima segnalazione per la Liguria.

Inocelliidae

Parainocellia bicolor (Costa, 1855)

Valle Argentina (IM), Drego, 27.V.2006 (1 larva); Sassello (SV), 14.VI.2006 (1 ♀); Busalla (GE), Bastia, 18.VI.2006, M. Bertolini leg. (1 ♀).

Specie euriecia a distribuzione sudeuropea, segnalata per quasi tutte le regioni italiane, sia in aree alpine che appenniniche. Precedenti segnalazioni per la Liguria si devono a NAVÁS (1928) e LETARDI (1994).

Neuroptera

Coniopterygidae

Coniopteryx (Coniopteryx) tineiformis Curtis, 1834

Alta Val Nervia (IM), 20.VIII.2006 (1 ♂).

Specie olartica, nota per Lombardia, Emilia-Romagna, Toscana, Lazio, Campania e Sardegna; prima segnalazione per la Liguria.

Coniopteryx (Metaconiopteryx) esbenpeterseni Tjeder, 1930

Perinaldo (IM), 9.VIII.2006, trappola luminosa (1 ♂, 1 ♀).

Specie a distribuzione europea, conosciuta per Lombardia, Veneto, Emilia-Romagna e Toscana; prima segnalazione per la Liguria.

Semidalis aleyrodiformis (Stephens, 1836)

Castellaro (IM), Santuario di Lampedusa, 27.V.2006 (1 ♂, 2 ♀♀).

Specie paleartica, nota per quasi tutte le regioni italiane; prima segnalazione per la Liguria.

Osmylidae***Osmylus fulvicephalus*** (Scopoli, 1763)

Sassello (SV), 15.VI.2006 (1 ♀).

Specie a diffusione eurasiatica, presente in Italia in prevalenza nelle regioni centro-settentrionali, ma anche in Calabria. Precedenti segnalazioni per la Liguria: INSOM *et al.* (1979).

Mantispidae***Mantispa styriaca*** (Poda, 1761)

Perinaldo (IM), 8.VII.2006, trappola luminosa (1 ♂, 1 ♀).

Specie a distribuzione centroasiatica-europea-mediterranea, nota per gran parte delle regioni italiane, fra cui la Liguria (LETARDI 1994).

Hemerobiidae***Hemerobius gilvus*** Stein, 1863

Sassello (SV), 15.VI.2006 (1 ♀).

Si tratta di una specie a distribuzione S-europea, nota per gran parte delle regioni italiane, già segnalata per la Liguria da MONSERRAT (1991).

Hemerobius humulinus Linné, 1758

Castellaro (IM), Santuario di Lampedusa, 13.VII.2006 (1 ♂).

Comune specie a distribuzione olartica, nota per quasi tutte le regioni italiane, già citata per la Liguria (MONSERRAT 1994).

***Hemerobius micans* Olivier, 1792**

Colle di Nava (IM), 1.VII.2006 (1 ♀).

Specie a diffusione sibirico-europea, segnalata per buona parte d'Italia, tra cui la Liguria (MONSERRAT 1994).

***Wesmaelius quadrifasciatus* (Reuter, 1894)**

Monte Toraggio (IM), 27.VI.2006 (1 ♀).

Specie sibirico-europea, nota in Italia per le regioni alpine; prima segnalazione per la Liguria.

***Wesmaelius subnebulosus* (Stephens, 1836)**

Bordighera (IM), Vallone del Sasso, 28.V.2006 (1 ♂); Castellaro (IM), Santuario di Lampedusa, 22.VI.2006 (3 ♀♀).

Specie a distribuzione olartica, conosciuta per gran parte d'Italia. Precedenti segnalazioni per la Liguria sono riportate da MONSERRAT (1994).

Chrysopidae

***Italochrysa italica* (Rossi, 1790)**

Castellaro (IM), Santuario di Lampedusa, 13.VII.2006 (1 ♀); San Biagio della Cima (IM), 25.VII.2006, trappola luminosa (1 ♂); Perinaldo (IM) 15.VII.2006, trappola luminosa (1 ♀).

Si tratta di una specie a distribuzione mediterranea, conosciuta per buona parte delle regioni italiane, tra cui la Liguria (CAPRA 1976).

Chrysopa formosa (Brauer, 1850)

San Biagio della Cima (IM), 25.VII.2006, trappola luminosa (2 ♀♀) e 28.VII.2006, trappola luminosa (1 ♂, 1 ♀).

Specie asiatico-europea nota per gran parte delle regioni italiane, ma non ancora per la Liguria, di cui questa costituisce la prima segnalazione.

Chrysopa perla (Linné) sensu Schneider, 1851

Colle di Nava (IM), 6.VII.2006 (1 ♂); Sassello (SV), 15.VI.2006 (1 ♀).

È una comune specie a distribuzione europea, nota per buona parte delle regioni italiane. Precedenti segnalazioni per la Liguria sono state rese note da INSOM *et al.* (1985).

Chrysopa viridana Schneider, 1845

Castellaro (IM), Santuario di Lampedusa, 22.VI.2006 (2 ♂♂, 3 ♀♀) e 13.VII.2006 (1 ♂); Valle Argentina (IM), Aigovo, 1.VIII.2006 (1 ♂).

Si tratta di una specie a diffusione euroturantica, conosciuta per quasi tutte le regioni italiane; già segnalata per la Liguria da NAVÁS (1929).

Chrysoperla gruppo *carnea* (Stephens, 1836)

Castellaro (IM), Santuario di Lampedusa, 22.VI.2006 (3 ♂♂, 1 ♀) e 13.VII.2006 (1 ♂); Valle Argentina (IM), Aigovo, 1.VIII.2006 (1 ♂); San Biagio della Cima (IM), 20.VII.2006 (4 ♀♀); Val Nervia (IM), 20.VIII.2006 (5 ♀♀); Val Nervia (IM), Passo Muratone, 20.VIII.2006 (4 ♂♂, 1 ♀).

Si tratta di un complesso di specie a distribuzione olartica, difficilmente distinguibili su base morfologica, con segnalazioni liguri ad opera di NAVÁS (1933) e MONSERRAT (1980).

Gli esemplari sono stati catturati sia con il retino che con la trappola luminosa in ambienti con vegetazione arborea.

Dichochrysa clathrata (Schneider, 1845)

Sassello (SV), 15.VI.2006 (1 ♂).

Specie a distribuzione E-mediterranea, nota per quasi tutta l'Italia. Questa costituisce la prima segnalazione sicura per la Liguria, poiché in ASPÖCK *et al.* 1980 l'entità è citata come presente in Liguria ma senza una indicazione precisa di località.

Dichochrysa flavifrons (Brauer, 1850)

Castellaro (IM), Santuario di Lampedusa, 3.VI.2006 (1 ♀); San Biagio della Cima (IM), 20.VII.2006 (1 ♀); Valle Argentina (IM), Aigovo, 1.VIII.2006 (1 ♂, 1 ♀); Val Nervia (IM), 20.VIII.2006 (1 ♂, 2 ♀♀); Val Nervia (IM), Passo Muratone, 20.VIII.2006 (1 ♀); Sassello (SV), 15.VI.2006 (2 ♂♂, 4 ♀♀).

Specie turanico-europea-mediterranea, segnalata per quasi tutte le regioni italiane, tra cui anche la Liguria (cfr. PRINCIPI 1956 e MONSERRAT 1980).

Dichochrysa prasina (Burmeister, 1839)

Bordighera (IM), Vallone del Sasso, 28.V.2006 (1 ♂, 1 ♀); Colla Melosa (IM), 25.VI.2006 (1 ♀); Castellaro (IM), Santuario di Lampedusa, 13.VII.2006 (1 ♀); San Biagio della Cima (IM), 20.VII.2006 (2 ♀♀); Val Nervia (IM), Passo Muratone, 20.VIII.2006 (1 ♂).

Specie a distribuzione eurasiatica, diffusa e comune in tutta Italia, già nota per la Liguria (PRINCIPI 1956).

Dichochrysa zelleri (Schneider, 1851)

Castellaro (IM), Santuario di Lampedusa, 3.VI.2006 (2 ♀♀); San Biagio della Cima (IM), 20.VII.2006 (1 ♀); Perinaldo (IM), 15.VIII.2006 (1 ♀).

Specie a distribuzione E-mediterranea, nota per gran parte delle regioni italiane; prima segnalazione per la Liguria.

Myrmeleontidae

Palpares libelluloides (Linné, 1764)

Perinaldo (IM), 9.VII.2006 (1 ♀).

Specie turanico-mediterranea, segnalata per quasi tutte le regioni peninsulari italiane (incluse Liguria ed Emilia-Romagna) oltre che per alcune stazioni xerothermiche dell'Italia settentrionale. Le precedenti segnalazioni liguri sono state pubblicate da CASTELLANI (1957), INSOM *et al.* (1985), PANTALEONI (1990) e LETARDI & PANTALEONI (1996).

***Myrmeleon (Morter) inconspicuus* Rambur, 1842**

Sassello (SV), 15.VI.2006 (5 larve, delle quali una è stata allevata, ottenendo 1 ♀).

Si tratta di una specie turanico-europea-mediterranea, nota per quasi tutta l'Italia; prima segnalazione per la Liguria.

***Distoleon tetragrammicus* (Fabricius, 1798)**

Perinaldo (IM), 9.VII.2006 (1 ♀); San Biagio della Cima (IM), 25.VII.2006 (1 ♀); Valle Argentina (IM), Aigovo, 1.VIII.2006 (1 ♀, con ala posteriore malformata); Sassello, 15.VI.2006 (1 ♀, 1 larva)

È una specie a distribuzione europea, comune in tutta Italia e già segnalata in Liguria da CASTELLANI (1957).

***Neuroleon nemausiensis* (Borkhausen, 1791)**

San Biagio della Cima (IM), 23.VII.2006, trappola luminosa in uliveto (1 ♀).

Specie a distribuzione circumediterranea, nota in quasi tutta Italia, Liguria compresa (CAPRA 1976).

***Neuroleon microstenus* (McLachlan, 1898)**

Perinaldo (IM), 15.VIII.2006 (3 ♂♂, 1 ♀).

Si tratta di una specie a distribuzione E-mediterranea, nota in Italia per Emilia-Romagna, Lazio, Puglia, Basilicata e Sicilia. Prima segnalazione per la Liguria.

Altri esemplari liguri (dati inediti) sono peraltro da tempo conservati nelle collezioni del Museo Civico di Storia Naturale "G. Doria" di Genova: Varazze (SV), VII.1918, leg. F. Invrea e VII.1934, leg.

Borgioli; Genova, VIII.1940; Casella (GE), VIII.1932, leg. C. Mancini; Cavi di Lavagna (GE), 20.VII.1931, leg. E. Berio.

Macronemurus appendiculatus (Latreille, 1807)

San Biagio della Cima (IM), 25.VII.2006 (1 ♂) e 20.VIII.2006 (1 ♂); Perinaldo (IM), 9.VII.2006 (1 ♀) e 15.VIII.2006 (4 ♀♀); Civezza (IM), 25.VIII.2006 (1 ♂).

Specie diffusa nel Mediterraneo occidentale, nota per quasi tutte le regioni italiane e già segnalata per la Liguria da CASTELLANI (1957), INSOM *et al.* (1979, 1985).

Gli esemplari sono stati raccolti in ambienti di gariga; l'individuo del 25.VII è stato catturato con la trappola luminosa.

Ascalaphidae

Libelloides coccajus (Denis & Schiffermüller, 1775)

Valle Argentina (IM), Andagna, 27.V.2006 (1 ♂, 1 ♀); Drego (IM), 27.V.2006 (1 ♀); Colla Melosa, 24.VI.2006 (1 ♀); Sassello (SV), 15.VI.2006 (1 ♀).

Si tratta di una specie a diffusione sud-europea, comune in tutt'Italia e già segnalata per la Liguria (AISTLEITNER 1980).

Libelloides longicornis (Linné, 1764)

Sassello (SV), 15.VI.2006 (1 ♂, 1 ♀).

Questa specie presenta una distribuzione sud-europea ed è ampiamente diffusa in Italia; già segnalata per la Liguria da LETARDI & PANTALEONI (1996). A Sassello convive nel medesimo habitat con la specie precedente.

CONCLUSIONI

Durante l'indagine sono state reperite 32 specie di Neuropterida, di cui: 1 di Megaloptera, 4 di Raphidioptera e 27 di Neuroptera.

Dieci specie (2 di Raphidioptera e 8 di Neuroptera) risultano

nuove per la Liguria: *Ornatoraphidia flavilabris*, *Xanthostigma aloy-siana*, *Coniopteryx tineiformis*, *C. esbenpeterseni*, *Semidalis aleyrodi-formis*, *Wesmaelius quadrifasciatus*, *Chrysopa formosa*, *Dichochrysa zelleri*, *Myrmeleon inconspicuus* e *Neuroleon microstenus*.

Ad esse si aggiunge *Dichochrysa clathrata*, precedentemente frutto di una segnalazione generica, non precisata, per l'area (ASPÖCK *et al.* 1980).

A riprova dello scarso stato di conoscenze sulla neurotterofauna ligure, è interessante notare che nessuna di queste specie può considerarsi rara in Italia; gran parte di esse, al contrario, è nota per quasi tutte le regioni italiane. Non è difficile ipotizzare che, proseguendo nelle ricerche, il numero dei Neuropterida liguri possa ulteriormente incrementarsi.

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BIBLIOGRAFIA

- AISTLEITNER. E., 1980 - Die Arten des Genus *Libelloides* Tjeder, 1972, der Iberischen Halbinsel (Neuroptera, Planipennia, Ascalaphidae) - *Entomofauna*, Linz, 1: 234-297.
- ASPÖCK U., ASPÖCK H. & HÖLZEL H., 1980 - Die Neuropteren Europas. Eine zusammenfassende Darstellung der Systematik, Ökologie und Chorologie der Neuropteroidea (Megaloptera, Raphidioptera, Planipennia) Europas - Ed. Goecke & Evers, Krefeld, 2 voll., 495+355 pp.
- ASPÖCK U., ASPÖCK H. & RAUSCH H., 1991 - Die Raphidiopteren der Erde. Eine monographische Darstellung der Systematik, Biologie, Ökologie und Chorologie der rezenten Raphidiopteren der Erde, mit einer zusammenfassende Übersicht der fossilen Raphidiopteren (Insecta: Neuropteroidea) - Ed. Goecke & Evers, Krefeld, 2 voll., 730+550 pp.
- BERNARDI IORI A., KATHIRITHAMBY J., LETARDI A., PANTALEONI R. A. & PRINCIPI M. M., 1995 - Neuropteroidea (Megaloptera, Raphidioptera, Planipennia), Mecop-

- tera, Siphonaptera, Strepsiptera. In: Minelli A., Ruffo S. & La Posta S. (eds), Checklist delle specie della fauna italiana - Ed. Calderini, Bologna, 62, 1-20.
- BÉRIO E., 1985 - Fauna d'Italia XXII, Lepidoptera Noctuidae I - Ed. Calderini, Bologna, 1030 pp.
- CAPRA F., 1976 - Quanto si sa sugli Odonati e Neurotteri dell'Arcipelago Toscano - *Lavori Soc. it. Biogeogr.*, Forlì, 5 (N. S.): 541-560.
- CASTELLANI O., 1957 - Contributo alla conoscenza della fauna entomologica d'Italia. Neuroptera - *Boll. Ass. romana Ent.*, Roma, 11-12: 9-14.
- INSOM E., DEL CENTINA P. & CARFÌ S., 1979 - Alcuni Neurotteri Planipenni italiani (Osmylidae, Ascalaphidae, Myrmeleonidae) - *Redia*, Firenze, 62: 35-52.
- INSOM E., DEL CENTINA P. & CARFÌ S., 1985 - II Contributo alla conoscenza della fauna neurotterologica italiana (Neuroptera: Raphidioptera, Planipennia) - *Redia*, Firenze, 68: 105-121.
- INSOM E., DEL CENTINA P. & CARFÌ S., 1986 - III Contributo alla conoscenza della fauna neurotterologica italiana: Neurotteri Planipenni della Sardegna - *Redia*, Firenze, 69: 651-654.
- LETARDI A., 1993 - Dati sulla distribuzione italiana di Megaloptera Sialidae, Raphidioptera Inocelliidae e Planipennia Mantispidae con particolare riferimento all'Italia Centrale (*Neuropteroidea*) - *Boll. Soc. ent. it.*, Genova, 125 (3): 199-210.
- LETARDI A., 1998 - Present knowledge of Italian Neuropterida: history, distribution and current problems - *Acta zool. fenn.*, Helsinki, 209: 145-149.
- LETARDI A., 2005 - Insecta Neuroptera, Megaloptera e Raphidioptera. In: Ruffo S., Stoch F. (eds) 2005. Checklist e distribuzione della fauna italiana - *Mem. Mus. civ. St. nat. Verona*, (2), Sez. Scienze della Vita, 16: 235-236.
- LETARDI A. & PANTALEONI R. A., 1996 - I Neurotteroidei W-palearctici della collezione del Museo di Zoologia dell'Università di Roma (Neuropteroidea) - *Fragm. ent.*, Roma, 28 (2): 277-305.
- MONSERRAT V. J., 1980 - Contribución al conocimiento de los Neurópteros de Italia (Neuroptera, Planipennia) - *Neur. int.*, Nice, 1 (2): 48-64.
- MONSERRAT V. J., 1991 - Nuevos datos sobre algunas especies del género *Hemerobius* L., 1758 (Insecta, Neuroptera: Hemerobiidae) - *Graellsia*, Madrid, 47: 61-70.
- MONSERRAT V. J., 1994 - Nuevos datos sobre los Coniopterígidos de las regiones paleártica y afrotropical (Neuroptera: Coniopterygidae) - *Graellsia*, Madrid, 50: 109-127.
- NAVÁS L., 1928 - Insetti europei del Museo Civico di Genova (*Megalomus andreinii* sp. n.) - *Boll. Soc. ent. it.*, Genova, 60: 75-83.
- NAVÁS L., 1929 - Insetti Neurotteri ed affini di Oropa (Biella) - *Boll. Soc. ent. it.*, Genova, 61: 44-47.
- NAVÁS L., 1933 - Insetti Neurotteri ed affini del Piemonte - *Mem. Soc. ent. it.*, Genova, 12: 150-162.
- PARENZAN P. & DE MARZO L., 1981 - Una nuova trappola luminosa per la cattura di Lepidotteri ed altri insetti ad attività notturna - *Inform. giov. Ent.* (suppl. *Boll. Soc. ent. it.*), Genova, 99: 5-11.
- POGGI R., 1993 - Catalogo dei tipi di Neurotteroidei del Museo Civico di Storia Naturale "G. Doria" di Genova (Insecta) - *Annali Mus. civ. St. nat. G. Doria*, Genova, 89: 415-444.

PRINCIPI M. M., 1956 - Contributi allo studio dei "Neurotteri" italiani. XIII. Studio morfologico, etologico e sistematico di un gruppo omogeneo di specie del gen. *Chrysopa* Leach (*C. flavifrons* Brauer, *C. prasina* Burm. e *C. clathrata* Schn.) - *Boll. Ist. Ent. Univ. Bologna*, 21: 319-410.

RIASSUNTO

Si riportano nuovi dati riguardanti la distribuzione in Liguria di Neuropterida (Megaloptera, Raphidioptera, Neuroptera). Sono state individuate, soprattutto nel settore occidentale della regione, 32 specie, di cui 11 non ancora note per l'area.

ABSTRACT

Contribution to the knowledge of Neuroptera of Liguria (Italy).

The Author reports new data on the distribution in Liguria of Neuropterida (Megaloptera, Raphidioptera, Neuroptera). The researches were carried out moreover in the western part of the region: 32 species, 11 of which not previously found in the area, are reported.

RES LIGUSTICAE CCLVI

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NOTES ON THE *REGALECUS GLESNE* OCCURRING IN
 THE GULF OF GENOVA AND IN LIGURO-PROVENÇAL
 WATERS (NW MEDITERRANEAN)

(PISCES, LAMPRIDIFORMES, REGALECIDAE)

INTRODUCTION

The king of herrings or oarfish *Regalecus glesne* Ascanius, 1772 is an open water mesopelagic fish occurring in all oceans, except in polar regions (OLNEY 1984). The species is characterised for having an extremely slender, laterally compressed, and very elongated body reaching lengths up to 17 m, and is considered the longest known teleost (ROBINS *et al.* 1986).

The genus *Regalecus* Ascanius, 1772 is generally treated as monotypic comprising a single biologically valid species *R. glesne* (HEEMSTRA 1986; PALMER 1986; NELSON 1994). However, Japanese and Mexican ichthyologists consistently report two other species of *Regalecus* occurring in the Pacific Ocean: *R. russelii* (Cuvier, 1816) and *R. kinoi* Castro-Aguirre *et al.*, 1991 (see FUJII 1984; CHAVEZ *et al.* 1985; CASTRO-AGUIRRE *et al.* 1991; RAMIREZ-MURILLO & SCHMIT-

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TER-SOTO 1996; BALART *et al.* 1999; SALAZAR-HERMOSO *et al.* 1999). Apparently these forms are distinguished from *R. glesne* on the basis of the following features: *R. kinoi* has a lesser number of rays either in the occipital crest or in the proper dorsal fin; it also possesses longer and typically lanceolated pectoral fins, a convex frontal margin of the head and a proportionally higher body. Whereas, *R. russelii* is principally distinguished from its congeners for having a larger number of gill rakers in the first gill arch (MORI 1956).

With the exception of the northern Adriatic Sea, *R. glesne* has been documented throughout the entire Mediterranean basin (FISCHER *et al.* 1987) and, wherever it occurs, the species is considered rare (TORTONESE 1970). However, in the Ligurian waters, the presence of this open water species is not exceptional and different documented instances of stranded or moribund specimens can be found in the scientific literature or in local journalistic articles (VINCIGUERRA 1918).

In this paper, data on the occurrence of the species in the Liguro-Provençal waters is overviewed taking into account historical and present literature as well as specimens preserved in systematic collections. The morphometric and meristic characters of a fresh specimen found in Arenzano harbour are compared with seven more or less complete individuals of *R. glesne* housed in the Museo Civico di Storia Naturale "G. Doria" of Genova (MSNG) and with one head stored in the "Dipartimento per lo Studio del Territorio e delle sue Risorse" of the University of Genova (Dip.Te.Ris.). Some information on the diet of Mediterranean oarfishes is also presented.

MATERIALS AND METHODS

Materials used in this study came from a wide variety of sources. Important data was obtained from extensive literature search, including journalistic articles and systematic collections. Records of oarfishes occurring in the Ligurian Sea and in the bordering localities of the French coast are summarized in Figure 1 and Table II.

Besides the fresh specimen collected at Arenzano (GE), 14.II.2003 (assigned to *R. glesne* and now in MSNG with catalogue number 53664), we disposed of seven liquid-stored examples housed in the Museum of Genova: MSNG 12306, Borghetto Santo Spirito (SV), 24.II.1906; MSNG 12307, Noli (SV), 10.V.1903; MSNG



Fig. 1 - Records of *Regalecus glesne* in the Liguro-Provençal waters according to Table II.

34931, Spotorno (SV), 28.VII.1950; MSNG 35367, Genova Prà (GE), 31.XII.1953; MSNG 54166, Santa Margherita Ligure (GE), 24.XI.1980; MSNG 54167, Sanremo (IM), 8.III.1992; MSNG 54168, Sanremo (IM), 18.IV.1993. The latter is represented only by the head and the extreme portion of the caudal end. Another individual, MSNG 37720, Genova Pegli (GE), 15.X.1959, was useless because cut into small pieces. Also some of the above cited specimens resulted problematic; in fact, due to extensive damage on the ventral side, the anal openings of the MSNG 35367, MSNG 54166 and MSNG 54167 specimens were not visible and parameters such as preanal and postanal lengths were not taken. Furthermore, during morphometric analyses on the MSNG 12306 specimen, we discovered that a large piece at mid-body was missing and that the anterior and posterior portions of the fish had been sewed back together, therefore, total length of the latter could only be estimated. According to body proportions measurements obtained from other samples of *Regalecus* examined in the present study, the postanal length of MSNG 12306 should have been 101.9 cm, which means that the missing piece was at least 47.7 cm; the biometric proportions were calculated in accordance to the following adjustment of total length: $TL = \text{preanal length (original)} + \text{postanal length (estimated)}$, that is to say $53 + 101.9 = 154.9$ cm (see Table I). We also examined the head of a specimen from Sanremo (IM), 19.II.1998 at present stored in the University of Genova (Dip.Te.Ris).

Tab. I – Absolute (cm) and proportional measurements expressed as percentage (%) of total length (TL) and head length (HL) of the Arenzano specimen (MSNG 53664) of *Regalecus glesne* compared with the ones of eight individuals of the species preserved in MSNG and Dip.Te.Ris.. Some

		Noli 10.V.1903 MSNG 12307			Borghetto Santo Spirito 24.II.1906 MSNG 12306		
		absolute	%TL	%HL	absolute	%TL	%HL
1	total length (TL)	118.0		1864%	(154.9)		1702%
2	preanal length	39.8	33.7%	629%	53.0	34.2%	582%
3	predorsal length	1.2	1.0%	19%	2.0	1.3%	22%
4	postanal length	78.2	66.3%	1235%	(101.9)	65.8%	1120%
5	prepelvic length	6.5	5.5%	103%	11.6	7.5%	127%
6	head length (HL)	6.3	5.4%		9.1	5.9%	
7	head height (through center of eye)	5.0	4.3%	80%	8.4	5.4%	92%
8	body height (at posterior margin of opercle)	4.8	4.0%	75%	8.1	5.2%	89%
9	body height (at anus)	3.2	2.7%	51%	7.1	4.6%	78%
10	preorbital length	1.5	1.2%	23%	2.5	1.6%	27%
11	supraorbital length	1.2	1.0%	19%	2.4	1.5%	26%
12	postorbital length	117.0	99.2%	1848%	(150.9)	97.4%	1658%
13	suborbital length	2.1	1.8%	33%	4.0	2.6%	44%
14	greatest body height	5.1	4.4%	81%	7.6	4.9%	84%
15	ocular diameter vertical	1.6	1.3%	24%	1.9	1.2%	21%
16	ocular diameter horizontal	1.7	1.4%	26%	1.9	1.2%	21%
17	interorbital space	1.2	1.0%	19%	1.4	0.9%	15%
18	internarial space	0.4	0.3%	6%	NM		
19	preopercular max height (vertical)	2.3	1.9%	36%	3.2	2.1%	35%
20	preopercular max length (diagonal)	4.2	3.5%	66%	5.3	3.4%	58%
21	opercular max height	2.5	2.2%	40%	4.1	2.6%	45%
22	maxillary length	2.3	2.0%	37%	3.9	2.5%	43%
23	maxillary width	0.8	0.7%	13%	1.5	1.0%	16%
24	pectoral fin lenght	NM			2.9	1.9%	32%
25	pectoral fin base lenght	0.8	0.7%	12%	1.2	0.8%	13%
26	max dorsal fin height (excluded occipital crest)	3.2	2.7%	51%	3.7	2.4%	41%
27	pelvic fin lenght (including distal lobes)	32.7	27.7%	517%	53.0	34.2%	582%
a	first gill arch lenght	3.2	3.2%	59.7%	4.6	3.0%	50.5%
b	longest gill filament	1.0	0.8%	15.2%	1.5	1.0%	16.5%
c	shortest gill filament	0.3	0.2%	4.1%	0.4	0.3%	4.4%
d	longest gillraker	0.6	0.6%	11.4%	1.0	0.6%	11.0%
e	gillrakers on the first arch	8+35=43			7+32=39		
f	number of rays in occipital crest	5+7=12			5+7=12		
g	total dorsal rays (occipital crest included)	397			164		
h	total dorsal rays up to anal opening	105			99		
i	caudal fin rays	0			0		
j	pectoral fin rays	13			12		
k	teeth upper jaw	6-7			0		
l	teeth lower jaw	6-7			barely perceivable		
m	forehead shape	slightly concave			concave		
n	caudal end	intact			mutilated		
o	spiny nubbins on caudal tip	5			NM		
p	pseudobranch	yes			yes		
q	small rakers between larger ones	no			yes		

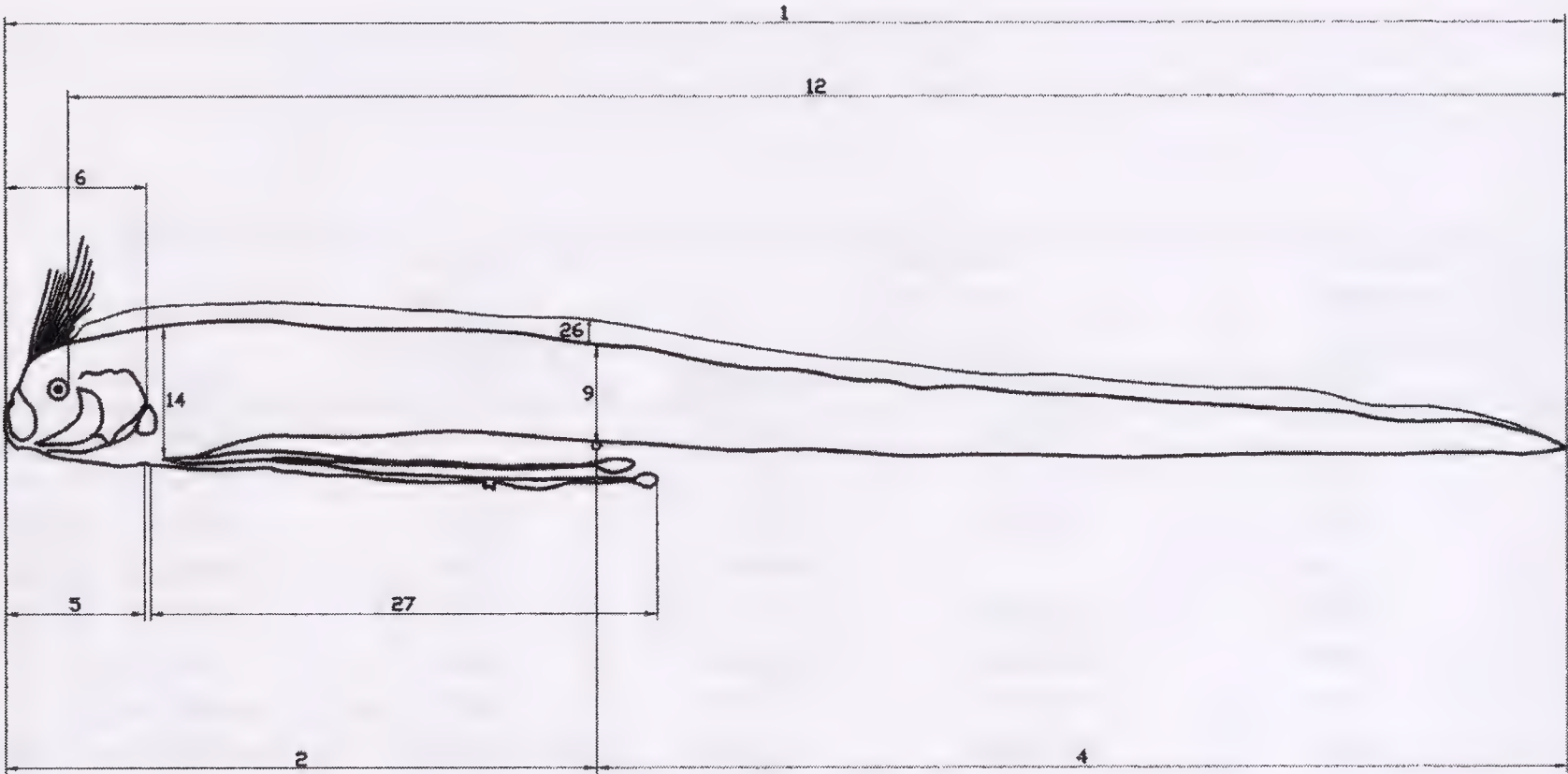
meristic and morphological characters are also given. †Total length of the Arenzano and Sanremo specimens measured in the laboratory. *Capture data. Estimated values are presented in parentheses. NM: parameter not measurable.

Spotorno 28.VII.1950 MSNG 34931			Genova Prà 31.XII.1953 MSNG 35367			Santa Margherita Ligure 24.XI.1980 MSNG 54166			
absolute	%TL	%HL	absolute	%TL	%HL	absolute	%TL	%HL	
180.4		1611%	258.0		2043%	86.5		2109.8%	1
64.5	35.8%	576%	NM			NM			2
1.8	1.0%	16%	3.1	1.2%	24%	0.9	1.0%	22.0%	3
115.2	63.9%	1029%	NM			NM			4
13.5	7.5%	121%	15.0	5.8%	119%	5	5.8%	122.0%	5
11.2	6.2%		12.6	4.9%	100%	4.1	4.7%		6
9.4	5.2%	83%	11.8	4.6%	93%	3.3	3.8%	80.5%	7
11.1	6.1%	99%	12.3	4.8%	98%	3.5	4.0%	85.4%	8
9.5	5.3%	85%	NM			NM			9
3.2	1.8%	29%	4.3	1.7%	34.1%	0.8	0.9%	19.5%	10
3.3	1.8%	30%	4.0	1.5%	31%	1	1.2%	24.4%	11
175.1	97.1%	1563%	251.5	97.5%	1992%	84.5	97.7%	2061.0%	12
4.3	2.4%	38%	5.8	2.3%	46%	1.5	1.7%	36.6%	13
11.0	6.1%	98%	12.7	4.9%	100%	3.4	3.9%	82.9%	14
2.3	1.2%	20%	2.9	1.1%	23%	1	1.2%	24.4%	15
2.3	1.2%	20%	3.0	1.1%	23%	1	1.2%	24.4%	16
2.0	1.1%	18%	2.3	0.9%	18%	0.7	0.8%	17.1%	17
0.7	0.4%	6%	1.0	0.4%	8%	0.4	0.5%	9.8%	18
4.2	2.4%	38%	5.1	2.0%	40%	1.9	2.2%	46.3%	19
6.9	3.8%	61%	7.9	3.1%	63%	2.8	3.2%	68.3%	20
4.0	2.2%	35%	6.3	2.4%	50%	1.8	2.1%	43.9%	21
4.2	2.3%	37%	5.0	1.9%	39%	1.8	2.1%	43.9%	22
1.9	1.0%	17%	2.2	0.8%	17%	0.9	1.0%	22.0%	23
3.3	1.8%	29%	4.3	1.7%	34%	0.8	0.9%	19.5%	24
1.6	0.9%	14%	1.6	0.6%	13%	0.6	0.7%	14.6%	25
NM			NM			2.6	3.0%	63.4%	26
NM			NM			NM			27
5.6	3.1%	50.0%	6.4	2.5%	50.7%	2.4	2.8%	58.5%	a
1.9	1.1%	17.0%	2.0	0.8%	15.8%	0.7	0.8%	17.1%	b
1.0	0.6%	8.9%	0.5	0.2%	4.0%	0.2	0.2%	4.9%	c
1.4	0.8%	12.5%	1.8	0.7%	14.3%	0.3	0.3%	7.3%	d
8+33=41			7+36=43			7+32=39			e
NM			NM			NM			f
260			366			359			g
106			NM			NM			h
0			0			0			i
11			11-12			12			j
0			9-10			0			k
0			5			4			l
strongly concave			slightly concave			concave			m
mutilated			mutilated			intact			n
NM			NM			4			o
yes			yes			yes			p
yes			yes			no			q

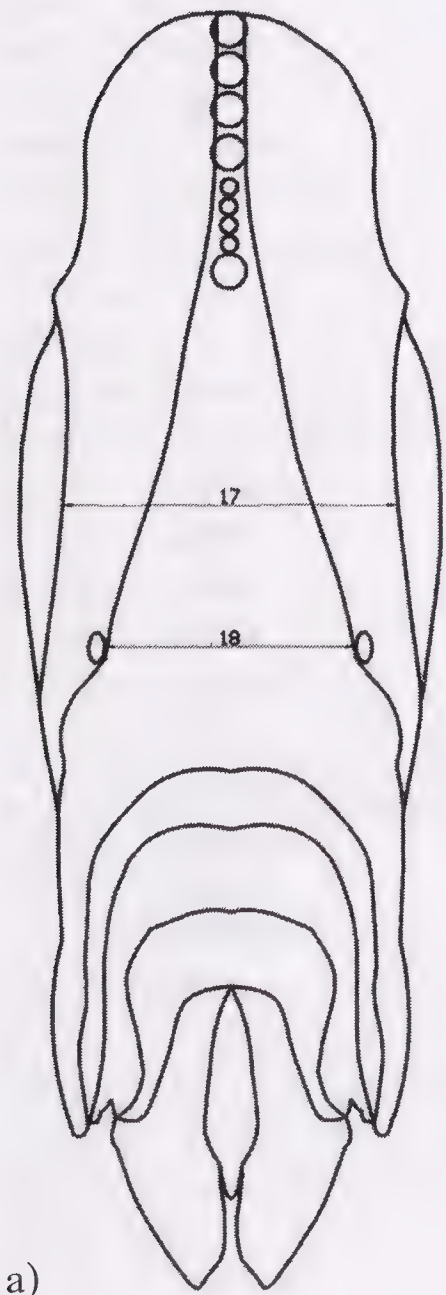
Tab. I (cont.)

		Sanremo 8.III.1992 MSNG 54167			Sanremo 18.IV.1993 MSNG 54168		
		absolute	%TL	%HL	absolute	%TL	%HL
1	total length (TL)	340†			433*		2353.3%
2	preanal length	NM			NM		
3	predorsal length	NM			NM		
4	postanal length	NM			NM		
5	prepelvic length	NM			NM		
6	head length (HL)	NM			18.4	4.2%	100.0%
7	head height (through center of eye)	15.5	4.56%		15.5	3.6%	84.2%
8	body height (at posterior margin of opercle)	16	4.71%		18	4.2%	97.8%
9	body height (at anus)	NM			NM		
10	preorbital length	NM			4	0.9%	21.7%
11	supraorbital length	4.1	1.21%		5	1.2%	27.2%
12	postorbital length	330	97.06%		NM		
13	suborbital length	8	2.35%		5.5	1.3%	29.9%
14	greatest body height	NM			NM		
15	ocular diameter vertical	3.3	0.97%		4.6	1.1%	25.0%
16	ocular diameter horizontal	3.3	0.97%		4.6	1.1%	25.0%
17	interorbital space	2.9	0.85%		3.7	0.9%	20.1%
18	internarial space	NM			1.5	0.3%	8.2%
19	preopercular max height (vertical)	5.7	1.68%		6.4	1.5%	34.8%
20	preopercular max length (diagonal)	9.5	2.79%		11.3	2.6%	61.4%
21	opercular max height	5.9	1.74%		6.1	1.4%	33.2%
22	maxillary length	5.8	1.71%		6.1	1.4%	33.2%
23	maxillary width	2.6	0.76%		2.6	0.6%	14.1%
24	pectoral fin lenght	5	1.47%		5.6	1.3%	30.4%
25	pectoral fin base lenght	2.4	0.71%		2.7	0.6%	14.7%
26	max dorsal fin height (excluded occipital crest)	6.6	1.94%		NM		
27	pelvic fin lenght (including distal lobes)	NM			NM		
a	first gill arch lenght	8.9	2.62%		9.3	2.1%	50.5%
b	longest gill filament	2.8	0.82%		2.7	0.6%	14.7%
c	shortest gill filament	0.4	0.12%		0.3	0.1%	1.6%
d	longest gillraker	1.8	0.53%		1.9	0.4%	10.3%
e	gillrakers on the first arch	8+29=37			9+33=42		
f	number of rays in occipital crest	NM			NM		
g	total dorsal rays (occipital crest included)	394			NM		
h	total dorsal rays up to anal opening	NM			NM		
i	caudal fin rays	0			NM		
j	pectoral fin rays	12			13		
k	teeth upper jaw	0			0		
l	teeth lower jaw	0			0		
m	forehead shape	concave			straight		
n	caudal end	intact			NM		
o	spiny nubbins on caudal tip	no			NM		
p	pseudobranch	yes			yes		
q	small rakers between larger ones	yes			yes		

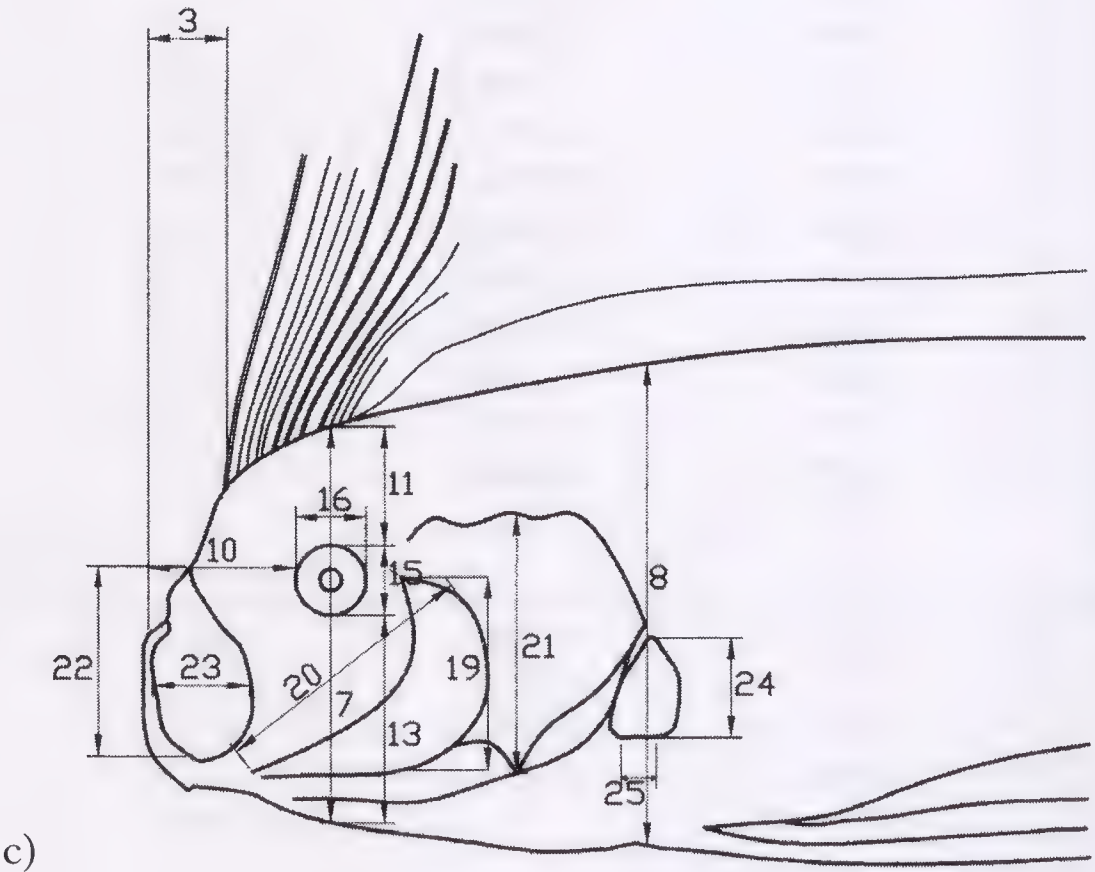
Sanremo 19.II.1998			Arenzano 14.II.2003			
absolute	Dip.Te.Ris. %TL	%HL	absolute	MSNG 53664 %TL	%HL	
206*		1271.60%	319†		2363%	1
NM			117.1	36.7%	867%	2
3.6	1.75%	22.22%	7	2.2%	52%	3
NM			201.9	63.3%	1496%	4
16.4	7.96%	101.23%	15	4.7%	111%	5
16.2	7.86%	100.00%	13.5	4.2%		6
13	6.31%	80.25%	13.5	4.2%	100%	7
14.1	6.84%	87.04%	16.5	5.2%	122%	8
NM			19	6.0%	141%	9
4.1	1.99%	25.31%	5.5	1.7%	41%	10
4.4	2.14%	27.16%	5	1.6%	37%	11
NM			306.5	96.1%	2270%	12
5.2	2.52%	32.10%	4	1.3%	30%	13
NM			20.5	6.4%	152%	14
3.9	1.89%	24.07%	4	1.3%	30%	15
4	1.94%	24.69%	4	1.3%	30%	16
2.9	1.41%	17.90%	NM			17
0.9	0.44%	5.56%	NM			18
6.4	3.11%	39.51%	7.5	2.4%	56%	19
11	5.34%	67.90%	NM			20
7.6	3.69%	46.91%	7.0	2.2%	52%	21
5.9	2.86%	36.42%	6.0	1.9%	44%	22
2.5	1.21%	15.43%	3.0	0.9%	22%	23
4.6	2.23%	28.40%	5.2	1.6%	39%	24
2.2	1.07%	13.58%	2.0	0.6%	15%	25
NM			4.0	1.3%	30%	26
NM			NM			27
8	3.88%	49.38%	8.5	2.7%	63.0%	a
2.1	1.02%	12.96%	2.5	0.8%	18.5%	b
0.4	0.19%	2.47%	0.8	0.3%	5.9%	c
1.9	0.92%	11.73%	2.0	0.6%	14.8%	d
7+ 32=39			5+34=39			e
5+7=12			NM			f
NM			280			g
NM			111			h
NM			0			i
13			12			j
0			0			k
0			0			l
straight			strait			m
NM			mutilated			n
NM			NM			o
yes			yes			p
yes			yes			q



b)



a)



c)

Figure 2 – Morphometric characters used in this study shown on a generalized *Regalecus* silhouette depicted with a “classical” occipital crest (rays intentionally shortened).

- a) frontal view
- b) lateral view
- c) head measurements in detail

Morphometric and meristic analyses were carried out using 43 parameters extrapolated from different works on regalecids available in the scientific literature. Longitudinal measurements, e.g. distances from snout tip to various points along the body, were taken straight-line (between vertical projections to the horizontal axis of the body), made with a metal measuring tape and recorded to the nearest millimetre. All measurements used in the present study are shown in Figure 2 and Table I. Immediately after its finding, the Arenzano specimen was taken to ICRAM "Centro Raccolta Campioni Mar Ligure", divided in two halves and frozen at -20° C. Subsequently, in the laboratory the specimen was dissected in order to establish sex and to gather information on stomach contents and then deposited in MSNG.

RESULTS AND DISCUSSION

The fresh specimen of *R. glesne* from Arenzano was 330 cm total length (TL). When collected, the fish was still alive but showed visible signs of injury, probably caused by the impact with a boat propeller. Unfortunately, neither the elongated rays of the occipital crest nor the peculiar oar-shaped pelvic fins were intact. The Arenzano regalecid is described as follows.

Body long, ribbon-like covered with tubercles, which became more elevated along the abdomen especially behind the anus. Mouth small, vertical and protractible. Lateral line starts from above the eye, curves downwards and runs in a strait line along the lower quarter of the body. Four longitudinal ridges from head to tail. Greatest body depth in the middle of its length. Anus positioned in the anterior third of the body. Caudal extremity mutilated, showing a healed cicatrix. Gastric caecum extends well past the anus. Eyes rounded and fairly big. Nostrils single, on each side of the snout just behind maxillary symphysis. Pectoral fins lanceolated, inserted horizontally. Teeth absent. Gill rakers long with minute spines projecting on the inner and outer margins. Scales absent. Anal and caudal fins absent. Apparently eight rays on occipital crest (No.1: very stout; No.2: very slender; No.3 to No.6: nearly as thick as the first; No.7: slightly less stout than the former; No.8: slender like the second; No.9: not thicker than rays of proper dorsal fin); bases of anterior 6 dorsal rays closely set. Fin rays simple and unseg-

mented. Coloration: body silvery-grey with irregular oblique dark streaks and blotches especially in the first third of the body. Forehead, parts below edge of gill covers and sides of the mouth black. Pupil dark and iris light. Fins crimson red. Macroscopic examination of the gonads, allowed us to identify the specimen as a male. Stomach empty.

Measurements of total length obtained from the specimen in fresh conditions resulted quite discordant with the ones taken after a two year permanence in the freezing chamber of the laboratory (see Table II). Although the Arenzano specimen did not present the typical bluish streaks on head and body described in the literature (HEEMSTRA 1986), an irregular blue indigo spot above the eye is visible in two individuals found in Sanremo (Figure 3).



Figure 3 – Two individuals (from Sanremo) with irregular blue indigo spot above the eye.

Furthermore, we examined the stomach contents of two specimens (MSNG 54167 and Dip.Te.Ris. specimen); the stomach contents were exclusively made by crustacean remains: more in details, they consisted respectively of 43 heads and 7 individuals of the Mediterranean krill, *Meganyctiphanes norvegica* (M. Sars, 1857), in advanced digestive status; the identification was possible on the basis of mandibles and other rests.

The king of herrings or oarfish is apparently very rare in the Mediterranean (TORTONESE 1970). Its presence in this sea can be traced back to the XVI century, when IMPERATO (1599) figured and described a bizarre fish under the name of "*spada marina*" from the Gulf of Napoli (TORTONESE 1970). Eggs and young individuals at different stages of development have been collected in the Strait of Messina (MAZZARELLI 1910; SANZO 1925; SPARTÀ 1927; BERDAR *et al.* 1975; CAVALLARO *et al.* 1980) and Elba Island (DAMIANI 1913), but adults of the species have been rarely studied. As the synonymy clearly shows, various nominal species have been erroneously described during the XIX century by ichthyologists working on Mediterranean specimens (see RISSO 1826; CUVIER & VALENCIENNES 1835; GIGLIOLI 1880). The examples used by the above mentioned authors were mainly obtained from Nice (France) (VINCIGUERRA 1918). Also the Ligurian Sea is an extraordinary site for oarfish findings, as proven by the following records: Noli (ARIOLA 1904); Savona (MEZZANA 1909); Borghetto S. Spirito, Arenzano, Albissola, Santa Margherita Ligure (VINCIGUERRA 1918); Spotorno (GUIGLIA 1950). Furthermore, the following individuals, held in the museum of Genova, are not mentioned in the literature: MSNG 35367-Genova Prà; MSNG 37720-Genova Pegli; MSNG 54166-S. Margherita Ligure; MSNG 54167-Sanremo; MSNG 54168-Sanremo as well as two other specimens captured respectively in 1997 and 1998 off Sanremo (see Table II).

The biometric and meristic analyses conducted on the Arenzano specimen and on the examples of *R. glesne* held at MSNG and Dip.Te.Ris., confirmed the high individual variability in body proportions, already described by other authors (PARKER 1883; GOODE & BEAN 1896; HUTTON 1961). Proportional data in Table I shows anomalies essentially concentrated in two individuals: in the Arenzano specimen four measurements related to head length (HL) were greater than values obtained from other specimens examined

Table II – Records of *Regalecus glesne* from the Liguro-Provençal waters (in chronological order). * Data not available or not furnished by the author/s. + Not measurable. In parentheses, size (TL) of fresh specimen. Dip. Te.Ris.: Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova; MHNN: Muséum d'Histoire Naturelle de Nice; MNHN: Musée National d'Histoire Naturelle de Paris; MOM: Musée Océanographique de Monaco; MZUF: Museo di Storia Naturale, Sezione di Zoologia “La Specola”, Firenze; MSNG: Museo Civico di Storia Naturale “G. Doria”, Genova.

	Date of occurrence	No. specimens	Size TL (cm)	Locality of occurrence	Reference	Notes
1)	IV, V [ante 1826]	at least 2	~ 155	Nice (near the shore)	Risso (1826)	Drawings of caudal and ventral fins imaginary
2)	V.1830	3	~ 212 - 290	Nice (near the shore)	Cuvier & Valenciennes (1835)	MNHN A-7125, MNHN A-7126, MNHN A-7128
3)	1871	1	*	Nice		MNHN 000-6479
4)	18.VIII.1877	1	88	Nice	Giglioli (1880)	MZUF 886
5)	19.IV.1891	1	219	Nice	Damiani (1913)	MZUF 2762
6)	1896	1	99,5	Nice		MNHN 000-4466
7)	1897	1	300	Beaulieu Saint-Jean	Vayssiére (1917)	Probably MHNN
8)	10.V.1903	1	125	Noli	Ariola (1904)	MSNG 12307
9)	24.II.1906	1	108	Borghetto S. Spirito (stranded)	Vinciguerra (1918)	MSNG 12306
10)	24.I.1908	1	330	Arenzano (stranded)	Vinciguerra (1918)	Specimen not preserved
11)	17.VII.1909	2	288, 332	Savona (near the shore)	Mezzana (1909)	Specimens lost
12)	10.III.1910	1	300	Monaco (captured in the port)	Vayssiére (1917)	Probably MOM 91 1870 (cast specimen)
13)	13.IX.1913	1	110	Castiglioncello (near the shore)	Vinciguerra (1918)	Specimen not preserved
14)	20.VI.1915	1	325	Albissola (speared in shallow water)	Vinciguerra (1918)	Specimen not preserved
15)	12.II.1917	1	236	S. Margherita Ligure	Vinciguerra (1918)	Specimen lost
16)	19.II.1934	1	130 or 140	Monaco (captured in the port)		MOM 91 2349
17)	28.VII.1950	1	188	Spotorno	Guiglia (1950)	MSNG 34931
18)	31.XII.1953	1	258	Genova Prà		MSNG 35367
19)	15.X.1959	1	+	Genova Pegli		MSNG 37720
20)	24.XI.1980	1	86.5	S. Margherita Ligure (trawl-net)		MSNG 54166
21)	8.III.1992	1	340 (362)	Sanremo (trawl-net)		MSNG 54167
22)	18.IV.1993	1	433	Sanremo		MSNG 54168
23)	09.III.1994	1	197	La Formigue		MOM 91 3743
24)	12.IX.1997	1	145	Sanremo (trawl-net, depth -500 m)	Garibaldi (<i>in verbis</i>)	Specimen not preserved
25)	19.II.1998	1	206	Sanremo (surface)		Head preserved (Dip.Te.Ris)
26)	14.II.2003	1	319 (330)	Arenzano (near the shore)	Present paper	MSNG 53664

(Figure 4), and in the Sanremo Dip.Te.Ris specimen, five measurements related to total length (TL) resulted as well very high (Figure 5). Moreover dorsal fin ray counts in some specimens resulted also quite discordant (see Table I). These anomalies could be linked to a more or less degree of mutilation of the caudal end, which in regalecid fishes seems to occur quite often (VINCIGUERRA 1918). Also the poor condition of some examined individuals (including the Arenzano fish) may have contributed to cause these distortions. Furthermore, it must be said that TL measurement given for the Sanremo Dip.Te.Ris specimen was taken on the fresh animal (Garibaldi *in verbis*) while the biometric data here presented derives from measurements obtained from its preserved head.

Particularly interesting is the presence of teeth in the upper and lower jaws of four preserved specimens: in MSNG 12307 they are bigger and equally distributed around the symphysis of the dentary and premaxillary bones; in MSNG 35367 they are much smaller and more abundant on the premaxillary rather than on the dentary, while in MSNG 12306 and MSNG 54166 they are barely perceivable and located only around the symphysis of the dentary. The presence of teeth seems to be a variable character among oarfishes (TRUNOV & KUKUEV 2005). It is quite interesting to note that teeth have rarely been described for Indo-Pacific specimens of *Regalecus*, however, due to their diminutive size, teeth can be easily overlooked in these fishes.

Furthermore, some interesting observations regarding the morphology of the occipital crest in the oarfish was revealed during this study. As indicated by different authors, the number of elongated rays on the forehead of oarfishes, is to be considered a taxonomic character which distinguishes different species within the genus *Regalecus* (see CHAVEZ *et al.* 1985; CASTRO-AGUIRRE *et al.* 1991; RAMIREZ-MURILLO & SCHMITTER-SOTO 1996). However such information is not always available due to the intrinsic fragility of these structures which, in most studied specimens, appear seriously damaged. In the Arenzano fish, the precise number of elongated rays of the occipital crest can be only tentatively assessed, but valuable observations regarding their reciprocal thickness were made. In fact, the "classic" occipital crest morphology described in the literature is formed by twelve rays (HULLEY & RAU 1969), of which the first is very stout, the second, third, fourth and fifth are very slender

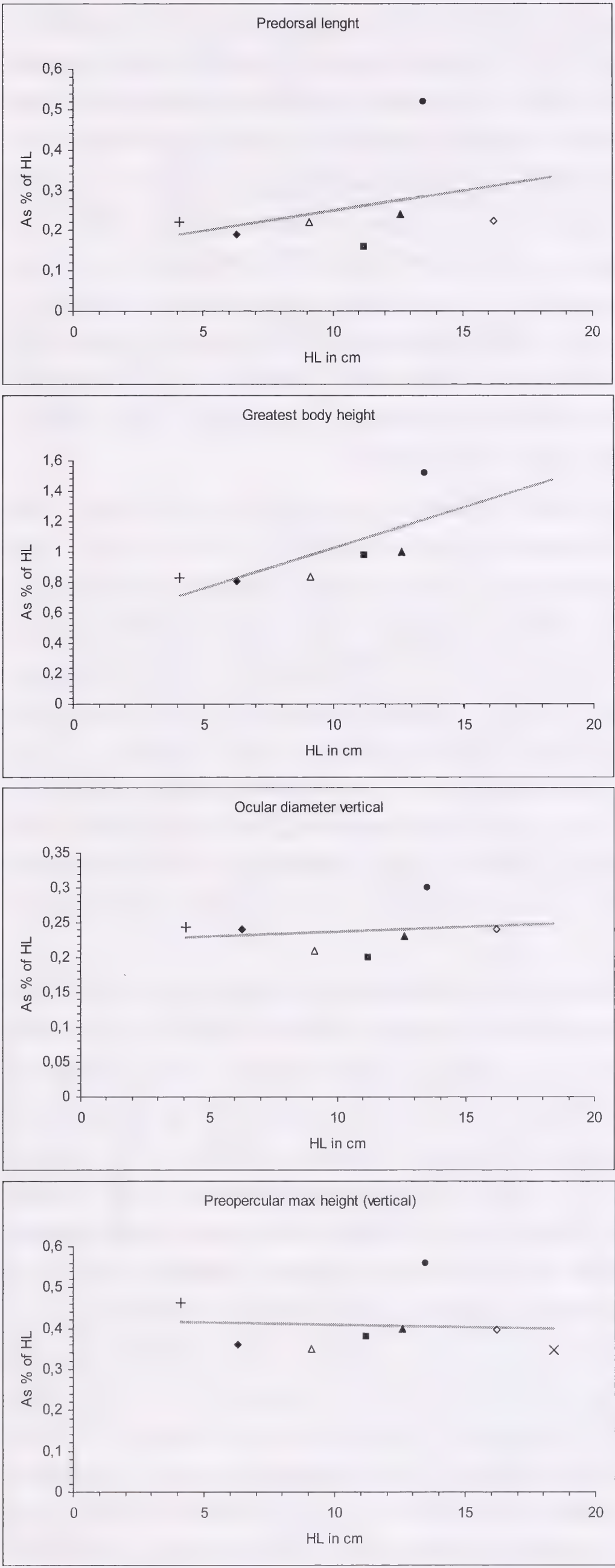


Figure 4 – Linear regression of four measurements related to head length.

- ◆ Noli (MSNG 12307);
- Spotorno (MSNG 34931);
- ▲ Genova Prà (MSNG 35367);
- Arenzano (MSNG 53664);
- △ Borghetto Santo Spirito (MSNG 12306);
- + Santa Margherita Ligure (MSNG 54166);
- × Sanremo (MSNG 54168);
- ◇ Sanremo (Dip.Te.Ris.).

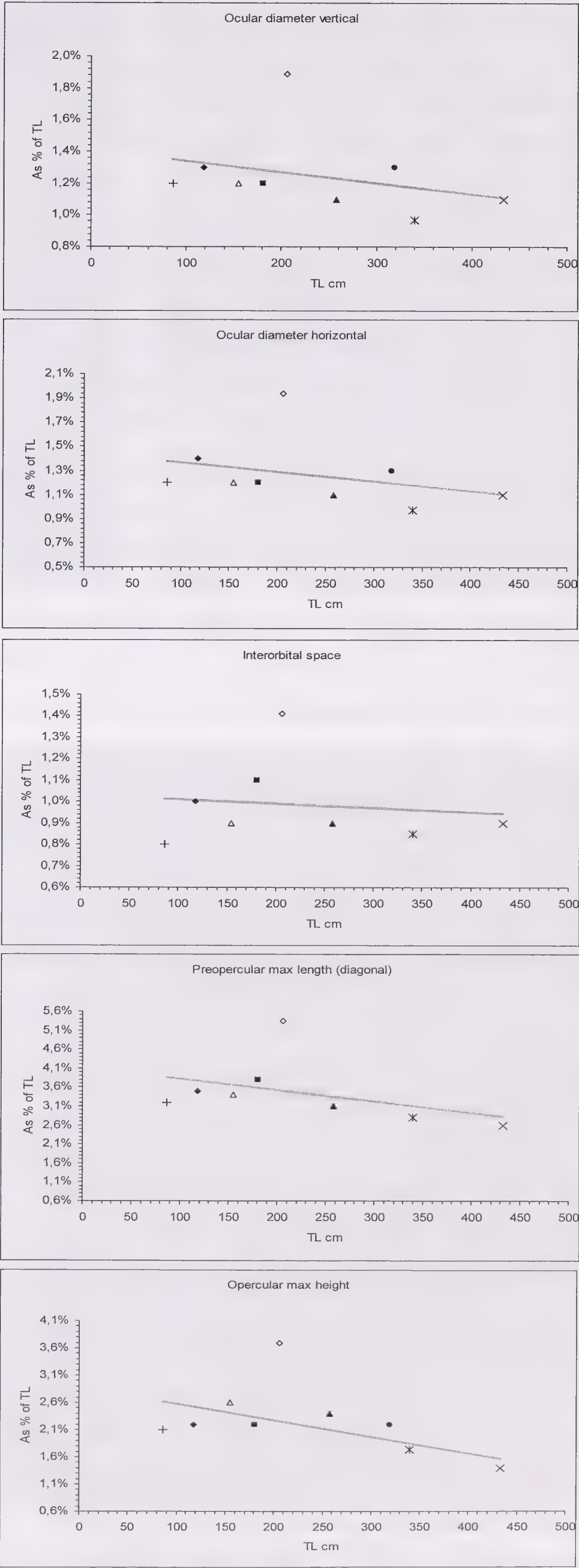


Figure 5 – Linear regression of five measurements related to total length.

- ◆ Noli (MSNG 12307);
- Spotorno (MSNG 34931);
- ▲ Genova Prà (MSNG 35367);
- Arenzano (MSNG 53664);
- △ Borghetto Santo Spirito (MSNG 12306);
- + Santa Margherita Ligure (MSNG 54166);
- × Sanremo (MSNG 54168);
- * Sanremo (MSNG 54167);
- ◇ Sanremo (Dip.Te.Ris.).

and the sixth, seventh, eighth and ninth are nearly as stout as the first, the remaining ones diminish in strength and become uniform in diameter with the proper dorsal fin rays. This kind of crest morphology was more or less observed in all liquid-stored specimens examined during the present study (see Figure 6). However, the *Regalecus* collected in Arenzano presents a different morphology of the occipital crest, which strongly differs from the classic descriptions, for having only one slender ray in position No. 2 (see Figure 7). To the best of our knowledge, a similar type of occipital crest morphology was described only once, for a large specimen stranded ashore in New Zealand (VON HAAST 1877).

Our study also revealed some incorrect biometric data furnished by VINCIGUERRA (1918) and re-proposed by GUIGLIA (1950) regarding preanal and postanal lengths of two individuals of *R. glesne* from Noli and Borghetto S. Spirito. For these two specimens, the preanal length is indicated as higher in respect to the postanal length, which must be considered erroneous since in this species the anus is positioned on the anterior third of the body (PALMER 1986).

The biometric analyses carried out on these two specimens of *R. glesne* during the present study, confirms only in part the inaccuracies given by the aforementioned authors. Infact, if for the Noli specimen there is an obvious mistake in the localization of the anal opening, for the Borghetto S. Spirito one, the measurements given by VINCIGUERRA (1918) are identical to ours and the biometric disproportions are due to the fact that the specimen is missing the central portion of its body. It is possible, that the latter individual of *Regalecus* was taken to the museum incomplete by its finder and that the museum staff, unaware of this, sewed the animal back together. Since the latter was reassembled behind the anal opening, we were able to estimate the amount of body portion missing (see above, in Materials and Methods).

Comparatively to gill arch morphology, it is surprising that few or even any authors have put emphasis on the presence of very small additional rakers between each of the larger ones. These structures were observed on the first gill arch in all of our specimens, besides MSNG 12307 and MSNG 54166 which appeared devoid of them, even when investigated with a binocular microscope. Since the latter individuals are juveniles, the absence of additional rakers could be connected with a late development of these structures within the

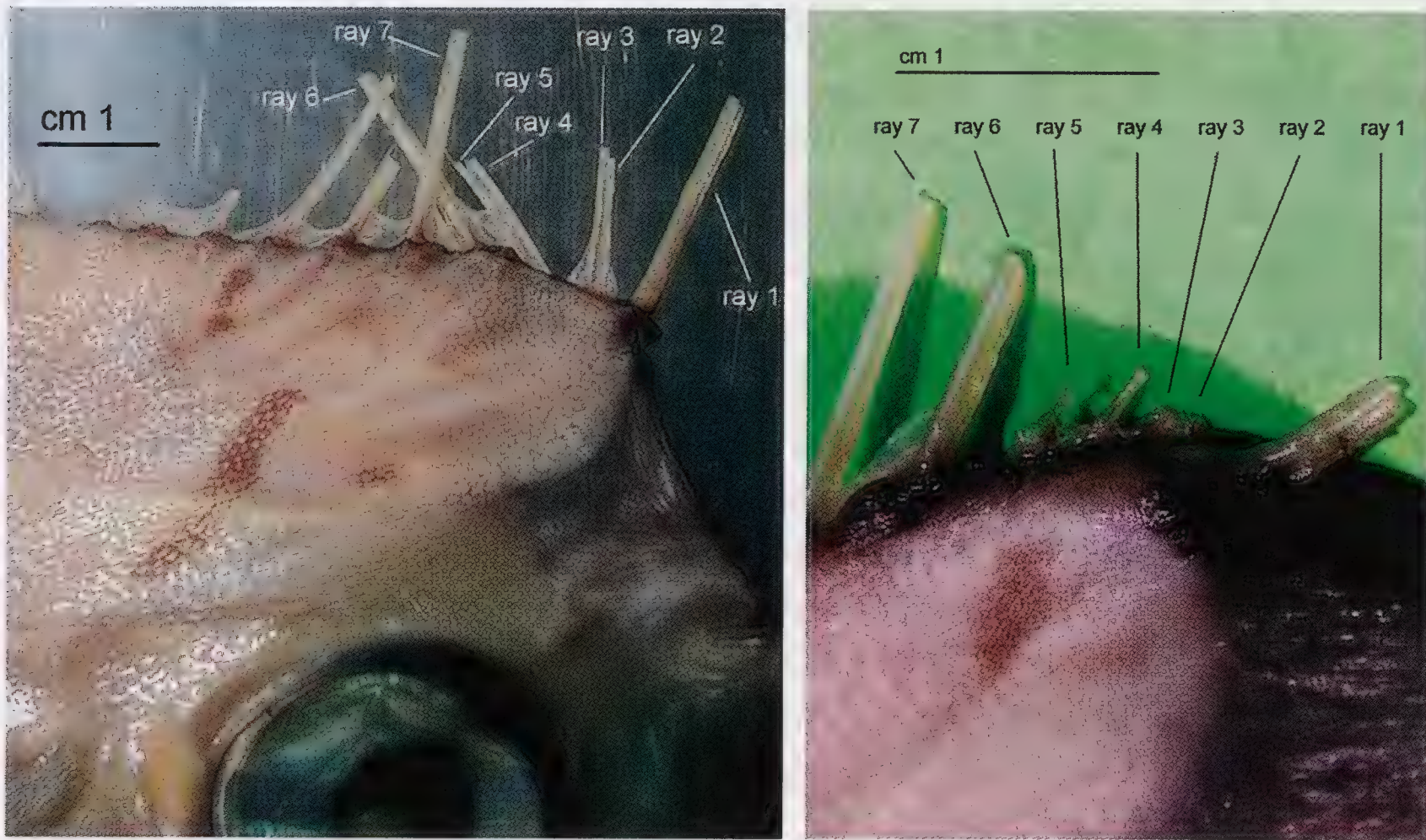


Figure 6 – Detail of the occipital crest in MSNG 35367 (Genova Prà) and MSNG 54168 (Sanremo) specimens.

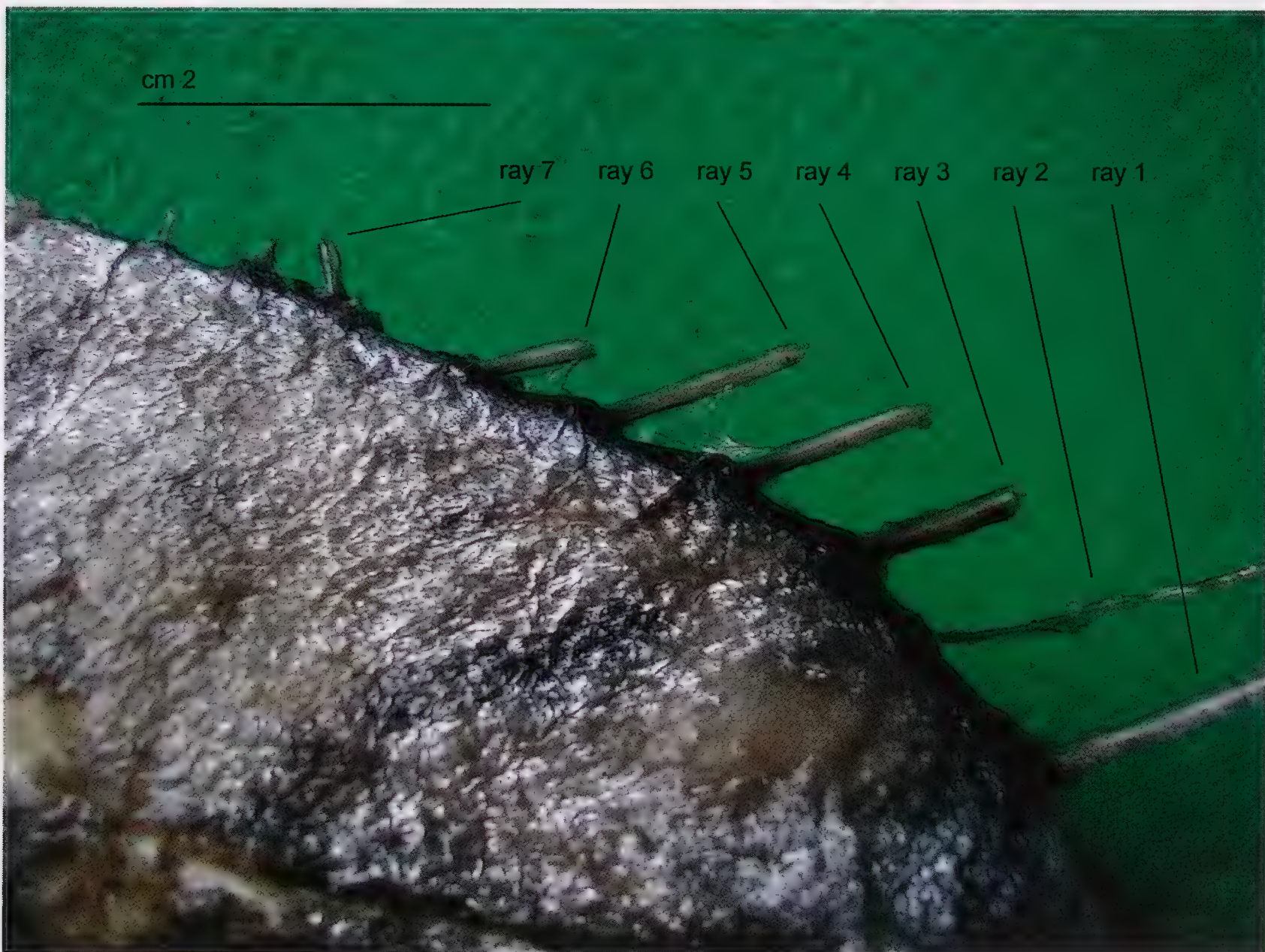


Figure 7 – Detail of the occipital crest in MSNG 53664 (Arenzano) specimen.

life cycle of regalecid fishes. The above mentioned individuals were among the only ones to show an intact caudal end with 4-5 minute spiny nubbins on the upper edge (see Figure 8). These structures may be rudiments deriving from caudal rays which are generally present on juvenile individuals (HEEMSTRA 1986).

Some authors have discussed whether the oarfish presence in the Mediterranean is due to the ingression of oceanic individuals or whether this sea possesses a stable resident population of the species (VINCIGUERRA 1918). This is difficult to say considering that *R. glesne* is an elusive mesopelagic fish whose biology and ecology are still poorly understood. However, the finding of eggs and young individuals at different stages of development is indicative of a self-maintaining Mediterranean population. In addition, the Ligurian Sea offers the ideal trophic conditions for a filter-feeder, as the oarfish appears to be (HUTTON 1961; HEEMSTRA 1986). Filter-feeding among Mediterranean oarfishes is confirmed by the stomach contents examined in the present study, as stressed also by other authors in the past (ORSI RELINI & RELINI 1993).

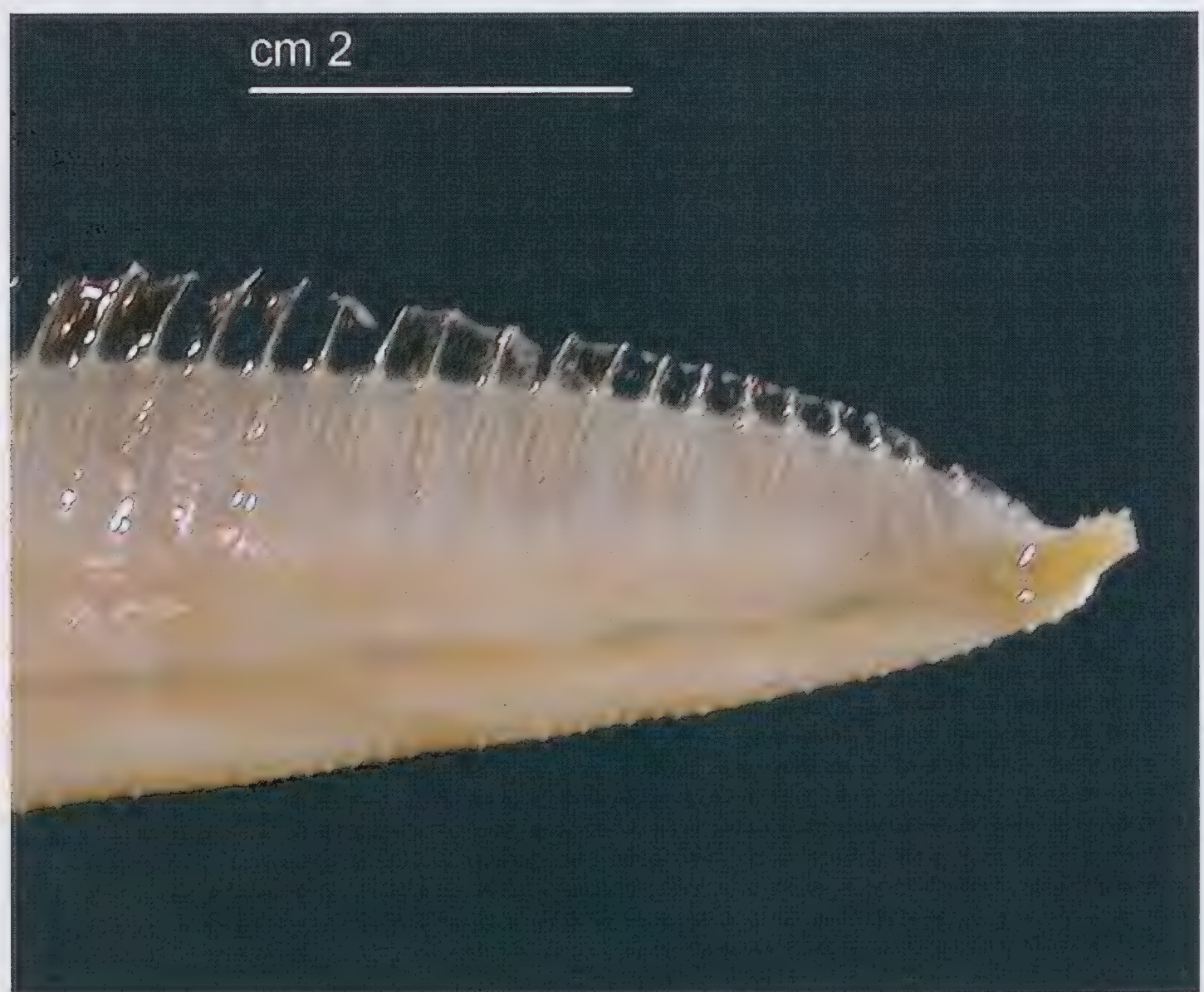


Figure 8 – MSNG 12307 (Noli) specimen: caudal end with spiny nubbins visible on upper edge.

The Liguro-Provençal waters present important upwelling phenomena (ASTRALDI *et al.* 1995; MILLOT 1999). These oceanographic features allow the creation of a highly dynamic ecosystem, in which large masses of euphausiids and other zooplanktonic organisms play a fundamental role in the food web. The establishment of peculiar trophic conditions all throughout the year could explain the more frequent occurrence of open water zooplanktivorous species like *R. glesne* and of many other top predators species, just like cetaceans, tunas, swordfish and elasmobranchs (ORSI RELINI *et al.* 1995; AA.VV. 2007). The general topography of this Mediterranean sector, characterized by a narrow continental shelf connected to bathyal grounds by numerous steep canyons (CORRADI *et al.* 1987), may also contribute to the unusual abundance of oceanic oarfishes. It is interesting to note that oarfish findings within the Ligurian Sea have occurred mainly in winter and spring, when planktonic production in this area is at highest levels (FABIANO 1982).

Concerning the taxonomy of the oarfish, it is still not certain if there is one or more species within the genus *Regalecus*. Therefore, it is very important that any specimen captured or washed ashore should be immediately reported to the nearest scientific institution and studied by a specialist. It is also greatly desirable that a major revision of the genus *Regalecus* should be undertaken as soon as possible.

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Finally this article is dedicated to the everlasting memory of “my little darling” Giulia Psomadakis.

REFERENCES

- AA.VV., 2007 - The pelagic domain – Pelagos, the Whale Sanctuary - *Italian Habitats*, Italian Ministry of the Environment and Territorial Protection, Roma, 156 pp.
- ARIOLA V., 1904 - Pesci nuovi o rari per il Golfo di Genova - *Annali Mus. civ. St. nat. Genova*, 41: 153-168.
- ASTRALDI M., BIANCHI C.N., GASPARINI G.P. & MORRI C., 1995 - Climatic fluctuations, current variability and marine species distribution: a case study in the Ligurian Sea (north-west Mediterranean) - *Oceanol. Acta*, Paris, 18 (2): 139-149.
- BALART E.F., CASTRO-AGUIRRE J.L. & AMADOR-SILVA E., 1999 - Un nuevo registro del pez *Regalecus kinoi* (Lampridiformes: Regalecidae) en el Golfo de California, México - *Oceanides*, La Paz, 14 (2): 137-140.
- BERDAR A., GUGLIELMO L. & GIACOBBE S., 1975 - Ritrovamento di tre giovani esemplari di *Regalecus glesne* Ascanius 1772 spiaggiati ad Oliveti (Messina) - *Atti Soc. pel. Sc. fis. mat. nat.*, Messina, 21: 124-139.
- CASTRO-AGUIRRE J.L., ARVIZU-MARTINEZ J. & ALARCON-GONZALEZ C., 1991 - Una especie nueva de *Regalecus* (Pisces: Lampridiformes) hallada en la Bahía de La Paz, Baja California Sur, México, con notas y observaciones taxonómicas y biogeográficas de la familia Regalecidae - *An. Esc. nac. Cienc. biol. Méx.*, Mexico City, 34: 159-171.
- CAVALLARO G., BERDAR A. & CAVALIERE A., 1980 - Spiaggiamento di *Regalecus glesne* Ascanius (Pisces: Regalecidae) nello Stretto di Messina - *Mem. Biol. mar. Oceanogr.*, Messina, 10 (5): 135-137.
- CHAVEZ H., GALVAN M. & TORRES-VILLEGAS J.R., 1985 - Primer registro de *Regalecus russellii* (Shaw) (Pisces: Regalecidae) de aguas mexicanas - *Invest. mar. CICIMAR*, La Paz, 2 (2): 105-112.
- CORRADI N., FANUCCI F., FIERRO G., FIRPO M., PICCAZZO M., RAMELLA A. & TUCCI S., 1987 - Importance des canyons sous-marins dans la dynamique sédimentaire de la Mer Ligure - *Quad. Ist. Geol. Univ. Genova*, 8 (4): 73-104.
- CUVIER G. & VALENCIENNES A., 1835 - Histoire naturelle des Poissons. Tome X, Livre XI - F.G. Levrault, Paris, xxiv+482 pp.
- DAMIANI G., 1913 - Di un “*Regalecus gladius*” Walb. all’Isola d’Elba, con note sui “*Regalecus*” mediterranei - *Boll. Soc. zool. ital.*, Roma, 1 (11-12): 329-339.

- FABIANO M., 1982 - Ciclo della sostanza organica in mare (pp. 31-38) - In: Della Croce N. (ed.), Il mare e la pesca, Associazione Produttori Pesca di Savona, Istituto di Scienze Ambientali Marine dell'Università di Genova, Coop Tipograf, Savona, 160 pp.
- FISCHER W., BAUCHOT M.L. & SCHNEIDER M.S., 1987 - Fishes FAO d'Identification des Espèces pour les Besoins de la Pêche. Méditerranée et Mer Noire. Vol. II (Vertébrés) - FAO, Roma, 1529 pp.
- FUJII E., 1984 - Family Regalecidae - In: Masuda H., Amaoka K., Araga C., Uyeno T. & Yoshino T. (ed.), The Fishes of the Japanese Archipelago, Tokai Univ. Press, Tokyo, 117 pp.
- GIGLIOLI E.H., 1880 - Elenco dei Mammiferi, degli Uccelli e dei Rettili ittiofagi appartenenti alla Fauna italiana e Catalogo degli Anfibi e dei Pesci italiani - Stamperia Reale, Firenze, 115 pp.
- GOODE G.B. & BEAN T.H., 1896 - Oceanic Ichthyology, a Treatise on the Deep-sea and Pelagic Fishes of the World, Based Chiefly upon the Collections made by the Steamers Blake, Albatross, and Fish Hawk in the Northwestern Atlantic - *Special Bulletin U.S. National Museum, Smithsonian Institution*, Washington, xxxv+553 pp.
- GUIGLIA D., 1950 - Nuova cattura di *Regalecus glesne* Asc. nel Golfo di Genova - *Annali Mus. civ. St. nat. G. Doria*, Genova, 64: 288-290.
- HEEMSTRA P.C., 1986 - Family No. 122: Regalecidae (p. 403) - In: Smith M.M. & Heemstra P.C. (ed.), *Smiths' Sea Fishes*, Macmillan, Johannesburg, 1047 pp.
- HULLEY P.A. & RAU R.E., 1969 - A female *Regalecus glesne* from Cape Province, South Africa - *Copeia*, Lawrence, 4: 835-839.
- HUTTON R.F., 1961 - A plerocercoid (Cestoda: Tetracophyllidae) from the oar-fish, *Regalecus glesne* (Ascanius), with notes on the biology of the oar-fish - *Bull. mar. Sci. Gulf Caribb.*, Coral Gables, 11 (2): 309-317.
- IMPERATO F., 1599 - Dell'Historia Naturale di Ferrante Imperato napolitano. Libri 28. Nella quale ordinatamente si tratta della diversa condition di miniere, e pietre. Con alcune historie di Piante et Animali sin'hora non date in luce - Stamperia a Porta Reale per Costantino Vitale, Napoli, 791 pp.
- MAZZARELLI G., 1910 - Larve e forme giovanili di Teleostei dello Stretto di Messina - *Riv. mens. Pesca Idrobiol.*, Pavia, 5 (12): 1-12 (=Lavori Ist. zool. R. Univ. Pavia N. 3, Mattei, Speroni & C., Pavia, 12 pp.).
- MEZZANA N., 1909 - *Il Cittadino*, Anno XL, n.150, Savona, 20 Luglio (quoted by VINCIGUERRA 1918).
- MILLOT C., 1999 - Circulation in the Western Mediterranean Sea - *J. mar. Syst.*, Oxford, 20: 423-442.
- MORI T., 1956 - Note on a rare fish *Regalecus russellii* (Shaw), Regalecidae, from Southern Japan Sea - *Sci. Rep. Hyogo Univ. Agricult.*, 2 (2): 33-36.
- NELSON J.S., 1994 - Fishes of the World - 3rd edition, John Wiley & Sons, New York, 600 pp.
- OLNEY J.E., 1984 - Lampridiformes: development and relationships (pp. 368-379) - In: Moser H.G., Richards W.J., Cohen D.M., Fahay M.P., Kendall Jr. A.W. & Richardson S.L. (ed.), Ontogeny and systematics of fishes, *Amer. Soc. Ich. Herp.*, Spec. Pub. No.1, Lawrence, Allen Press, 760 pp.
- ORSI RELINI L., GARIBALDI F., CIMA C. & PALANDRI G., 1995 - Feeding of the

- swordfish, the bluefin and other pelagic nekton in the western Ligurian Sea - *ICCAT, Coll. Vol. Sci. Pap.*, Madrid, 44 (1): 283-286.
- ORSI RELINI L. & RELINI G., 1993 - *Meganyctiphanes norvegica* (Sars) (Crustacea Euphausiacea) nelle reti trofiche del Mar Ligure - *Biol. Mar., Suppl. Not. S.I.B.M.*, Genova, 1: 151-154.
- PALMER G., 1986 - Regalecidae (pp. 727-728) - In: Whitehead P.J.P., Bauchot M.L., Hureau J.C., Nielsen J. & Tortonese E. (eds.), *Fishes of the North-Eastern Atlantic and the Mediterranean*, UNESCO, Paris, Vols. I-III, 1473 pp.
- PARKER T.J., 1883 - On a specimen of Great Ribbon Fish (*Regalecus argenteus*, n. sp.), lately obtained at Moeraki, Otago - *Trans. N. Z. Inst.*, Wellington, 16: 284-296.
- RAMIREZ-MURILLO R. & SCHMITTER-SOTO J.J., 1996 - Un segundo *Regalecus kinoi* Castro-Aguirre, Arvizu-Martinez & Alarcon-Gonzalez (Pisces: Regalecidae), hallado en Zihuatanejo, Guerrero - *Cuad. mex. Zool.*, Ciudad de México, 2 (1): 40-43.
- RISSE A., 1827 - Histoire naturelle des principales productions de l'Europe méridionale, et particulièrement de celles des environs de Nice et des Alpes maritimes - F.G. Levrault, Paris, vol. 3, xvi+480 pp.
- ROBINS C.R., RAY G.C., DOUGLAS J. & FREUND R., 1986 - A field guide to Atlantic coast fishes of North America - The Peterson field guide series, Houghton Mifflin Comp., Boston, 352 pp.
- SALAZAR-HERMOSO F., OCHOA-LOPEZ E. & VILLAVICENCIO-GARAYZAR C., 1999 - Stranding records of the oarfish in and around Bahia de La Paz, Mexico - *Calif. Fish Game*, Sacramento, 85 (2): 70-74.
- SANZO L., 1925 - Uova e larve di *Regalecus glesne* Asc. - *Mem. Com. tal. ital.*, Venezia, 118: 1-7.
- SPARTÀ A., 1927 - Contributo alla conoscenza dello sviluppo post-larvale in *Regalecus glesne* Asc. - *Mem. Com. tal. ital.*, Roma, 135: 1-8.
- TORTONESE E., 1970 - Osteichthyes (Pesci Ossei). Parte Prima - Fauna d'Italia, Vol. X, Calderini, Bologna, 565 pp.
- TRUNOV I.A. & KUKUEV E.I., 2005 - New data on Fish of the Family Trachipteridae and Regalecidae (Trachipteroidei) from the Argentina Trench (Southwestern Atlantic) - *J. Ichthyol.*, Birmingham, 45 (3): 223-228.
- VAYSSIÈRE M.A., 1917 - Note zoologique et anatomique sur un *Regalecus* (*Gymnetrus*) *gladius* Cuv. et Valenc. pris dans le Golfe de Marseille - *Bull. Mus. natl. Hist. nat.*, Paris, 23: 15-25.
- VINCIGUERRA D., 1918 - Intorno ai *Regalecus* del Golfo di Genova e di altre località italiane - *Annali Mus. civ. St. nat. G. Doria*, Genova, 48: 76-92.
- VON HAASST J., 1877 - Notes on a *Regalecus pacificus*, a new species of Ribbon Fish from New Zealand Seas - *Trans. N. Z. Inst.*, Wellington, 10: 246-250.

ABSTRACT

The description of a regalecid fish which came ashore in the harbour of Arenzano (Gulf of Genova) on 14 February 2003 is given. The specimen, found moribund on the sea surface, was gathered and stored for study. Morphometric and meristic analyses were performed on the latter and compared with those of eight liquid-stored individuals of *Regalecus glesne* preserved in the Museo Civico di Storia Naturale "G. Doria" of Genova (MSNG) and in the Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova (Dip.Te.Ris.). Exclusive observations on the structure of the occipital crest and other interesting morphological features, among with some dietary data, are also presented. Although the taxonomy of the genus *Regalecus* is at present in a somewhat confused state, the Arenzano fish can be provisionally assigned to *Regalecus glesne* Ascanius, 1772.

RIASSUNTO

Note su *Regalecus glesne* presente nel Golfo di Genova e nelle acque Liguro-Provenzali (Mediterraneo nord-occidentale) (Pisces, Lampridiformes, Regalecidae).

In questo lavoro viene documentato il ritrovamento di un *Regalecus* nel porticciolo di Arenzano (Golfo di Genova). Sull'esemplare, raccolto moribondo in acque superficiali il 14.II.2003, sono state eseguite dettagliate analisi morfometriche e meristiche. I dati ottenuti sono stati confrontati con quelli ricavati da otto esemplari di *Regalecus glesne* conservati in alcool e appartenenti alle collezioni del Museo Civico di Storia Naturale "G. Doria" di Genova (MSNG) e del Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova (Dip.Te.Ris.). Vengono presentate interessanti osservazioni morfologiche, incluse alcune inedite relative alla struttura della cresta occipitale e sulle abitudini alimentari. Nonostante il genere *Regalecus* sia attualmente contraddistinto da incertezze tassonomiche, il regaleco di Arenzano può essere provvisoriamente attribuito a *Regalecus glesne* Ascanius, 1772.

RESUMÉ

Notes sùr *Regalecus glesne* présent dans le Golfe de Genova et dans les eaux Liguro-Provençales (Méditerranée nord-occidental) (Pisces, Lampridiformes, Regalecidae).

La description d'un poisson du genre *Regalecus* qui est entrée dans le petit port d'Arenzano (Golfe de Genova) le 14 Février 2003 est donnée. L'exemplaire, trouvé moribond sur la surface de la mer, a été recueilli et conservé dans le but de l'étudier. Cet individu a été analysé et ses caractéristiques morphométriques et méristiques ont été comparées avec celles des huit individus de *Regalecus glesne*, conservés en alcool dans le Museo Civico di Storia Naturale "G. Doria" de Genova (MSNG) et dans le Dipartimento per lo Studio del Territorio e delle sue Risorse, Università di Genova (Dip.Te.Ris.). Le travail présent des observations morphologiques, compris des intéressantes remarques sùr la crête occipital et sùr le régime alimentaire. Bien que la taxonomie du genre *Regalecus* est à ce jour en quelque sorte confuse, le poisson de Arenzano peut provisoirement être attribué à *Regalecus glesne* Ascanius, 1772.

PIERFRANCO CAVAZZUTI*

NUOVI *CARABUS* L. E *CYCHRUS* F. DI CINA ED IRAN.
DESCRIZIONI E NOTE SISTEMATICHE.

(COLEOPTERA, CARABIDAE)

INTRODUZIONE

La fauna carabidologica della Cina è ancora lontana dall'essere conosciuta in modo soddisfacente; lo testimonia la continua produzione di pubblicazioni che riportano le descrizioni di nuove specie e sottospecie provenienti da quel paese, la cui scoperta è oggi resa possibile dall'apertura di nuove strade che rendono accessibili alla ricerca località che fino a ieri erano ancora irraggiungibili.

In questo articolo vengono descritti alcuni nuovi taxa di *Carabus* e *Cychrus*, provenienti, nella maggior parte, da zone già conosciute e più volte indagate in passato, oppure, come nel caso di *Carabus* (*Cupreocarabus*) *lixianensis pseudomorettoi*, di un taxon già raccolto da alcuni anni e a lungo confuso con *C. morettoi* Deuve, 1997, dal quale è difficilmente separabile senza il ricorso all'esame degli organi genitali maschili.

Inoltre lo studio di un importante lotto di *Lamprostus*, raccolti in Iran da Jindrich Prochazka, ha consentito di individuare una specie inedita proveniente dall'Iran nord-occidentale, una regione ancora oggi quasi del tutto sconosciuta sotto l'aspetto naturalistico.

DESCRIZIONE DEI NUOVI TAXA

***Carabus (Apotomopterus) mecynodes mitis* n. ssp.** (fig. 1)

L o c u s t y p i c u s: Cina occidentale. Sichuan meridionale, Mianning Xian, Passo a Sud-Ovest di Mianning, 2650 m.

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Serie tipica: Holotypus ♂, locus typicus, in coll. dell'autore. Paratypi: 49 ♂♂, 32 ♀♀, ibidem, in coll. dell'autore, del MSNG, e in numerose altre collezioni.

Descrizione. Dimensioni: lunghezza totale, mandibole comprese, 27-32 mm. Larghezza massima delle elitre 8,4-10,8 mm. Colorazione bicolore non molto vivace: capo e pronoto sono lucidi, neri, con deboli sfumature blu o verdi sulle aree laterali del pronoto; le elitre hanno un aspetto sericeo, variabili fra il rosso e il bruno rameico più o meno scuro, talora con qualche riflesso verde nella zona basale; margini concolori, o al più, con lievi riflessi verdi nella zona omerale. Solo due esemplari hanno le elitre completamente verdi. Arti e parti inferiori nere. Forma piuttosto snella.

Il capo è normale, la fronte non saliente e molto liscia, con alcune rughe sulla sommità e sul collo. I solchi frontali sono molto brevi e limitati alla parte anteriore e al clipeo. Le mandibole sono robuste ma brevi. Le antenne, piuttosto sviluppate, superano la metà delle elitre nel ♂ e la raggiungono nella ♀.

Il pronoto è trasverso (rapp. $L_p/l_p = 1,35$), largo tanto anteriormente quanto posteriormente, con i lati molto arcuati e ristretti verso la base, ma senza formare un'apprezzabile sinuosità. Gli angoli posteriori sono ottusi, smussati e per nulla salienti. Il disco è molto convesso: forma due lobi un poco rigonfi, incisi dalla linea mediana e limitati poco prima della base da una depressione curvilinea. La superficie è liscia sul disco, finemente rugosa nella parte posteriore, sui margini e, talora, anche lungo la linea mediana.

Le elitre sono in ovale allungato, con gli omeri sfuggenti, e mostrano una chiara sinuosità nella zona preapicale. Il disco è molto convesso e la scultura, omodinama, è molto regolare, con solo gli intervalli primari interrotti frequentemente da piccoli punti. Le strie sono molto finemente punteggiate.

Edeago (figg. 12-13) caratteristico della specie, molto stretto alla base e bruscamente flesso verso il basso, nella porzione distale. La lama apicale è larga come nella ssp. *liliana* Cavazzuti, 1997 e obliquamente troncata. Su entrambi i lati della porzione mediana sono presenti delle profonde rughe laterali oblique. In visione dorsale l'apice forma un triangolo quasi retto, smussato e rivolto a destra.

Derivatio nominis. Il nome latino della nuova sottospecie: *mitis*, dal significato di mite, mansueto, è stato suggerito

dal suo aspetto un poco dimesso, obiettivamente meno appariscente rispetto ai taxa conspecifici noti.

Osservazioni e note. *Carabus (Apotomopterus) mecynodes mitis* è perfettamente caratterizzato dalle sue ridotte dimensioni e dal cromatismo scuro, molto meno metallico e appariscente delle altre sottospecie conosciute: *liliana* Cavazzuti, 1997, *combustus* Cavazzuti & Ratti, 1999, *pinchuanensis* Imura, 1999 (= *sericatus* Cavazzuti, 1999) ed *helena* Kleinfeld, 1999. La sottospecie maggiormente differenziata sotto ogni aspetto (cromatico, dimensionale ed edeagico) resta comunque quella nominale (ssp. *mecynodes* Bates, 1890), conosciuta solo attraverso gli esemplari delle vecchie collezioni, la quale, oltre ad essere molto variabile nella colorazione, ha le elitre più dilatate posteriormente e l'estremità della lama apicale dell'edeago ancora molto più larga.

***Carabus (Apotomopterus) patroclus xinshibanus* n. ssp. (fig. 2)**

Locus typicus: Cina occidentale. Sichuan meridionale, Ganluo Xian (Xinshiba), Passo fra Ganluo e Shimian, 29°29'48"N, 102°31'11"E, 2380 m.

Serie tipica: Holotypus ♂, locus typicus. Paratypi: 4 ♀♀, ibidem, in coll. dell'autore.

Descrizione. Dimensioni: lunghezza totale, mandibole comprese, 31-32 mm. Larghezza massima delle elitre 9,5-10 mm. Il colore è uniformemente nero, opaco nella ♀, più lucido nel ♂. La forma è molto slanciata.

Di aspetto notevolmente più robusto nei confronti della sottospecie tipica, che dovrebbe corrispondere agli esemplari provenienti dalle zone circostanti a Mianning, ha il capo più grande, ma la fronte molto meno saliente e subpiana, con i solchi laterali debolissimi, e le antenne non raggiungenti la metà delle elitre.

Il pronoto è decisamente più trasverso (rapp. $L_p/l_p = 1,26$), con i lati lungamente arcuati nel tratto anteriore e modestamente sinuati poco prima della base. I margini sono sottilmente rilevati e recano una setola basale e una mediana. Il disco è scarsamente convesso, è lievemente depresso nel centro lungo la linea mediana e forma

una larga svasatura lungo i margini, nella quale vengono inglobate anche le impressioni basali. Gli angoli posteriori non sono salienti ma formano una lieve indentatura agli angoli. Tutta la superficie è solcata da finissime e fitte rughe trasversali.

Le elitre sono molto allungate e ristrette alla base, hanno gli omeri segnati ma sfuggenti, i lati poco dilatati e la maggiore ampiezza situata oltre la metà. Il disco è molto convesso. La scultura, eterodinama, è relativamente forte, avendo gli intervalli primari un poco più larghi e più rilevati degli altri e frequentemente e profondamente interrotti in granuli o brevissimi segmenti. I secondari e i terziari sono continui e uguali fra loro; le strie sono finemente punteggiate.

Zampe robuste e molto sviluppate.

Edeago (figg. 14-15) a lobo mediano poco curvato e con la lama apicale alquanto allungata, pressoché dritta, non acuta all'estremità, ma con i lati paralleli e la punta arrotondata. In visione dorsale la lama apicale si presenta di forma triangolare, stretta e allungata.

Derivatio nominis. Dal toponimo della località, prossima al locus typicus, dal quale il nuovo taxon proviene.

Osservazioni e note. La nuova sottospecie di *C. patroclus* Breuning, 1933 ha l'habitus molto allungato, che ricorda la ssp. *xiaoxianglingensis* Cavazzuti, 1996, ma presenta elitre meno parallele, più dilatate verso il terzo distale e dotate di una scultura un poco più forte e aspra, tuttavia meno rilevata che nella ssp. *catagraphus* Cavazzuti & Rapuzzi, 2005, infeudata molto più a ovest, presso Jiulong.

Tuttavia il carattere più peculiare e determinante per la separazione del nuovo taxon è costituito dalla forma particolare dell'edeago, che non si presenta arcuato e acuto come negli altri taxa conspecifici, ma di forma più allungata, parallela e ricurva sul lato dorsale.

***Carabus (Archaeocarabus) lacertosus* n. sp. (fig. 3)**

Diagnosi. Il pronoto insolitamente robusto e trasverso, dotato di lobi posteriori larghi e salienti, rende immediatamente riconoscibile la nuova specie.

Locus typicus: Cina occidentale. Sichuan meridionale, Mianning Xian, Passo a Sud-Ovest di Mianning, 2650 m.



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Figg. 1-4 - Habitus degli Holotypi dei nuovi taxa:

1: *Carabus (Apotomopterus) mecynodes mitis* n. ssp.; 2: *C. (A.) patroclus xinshibanus* n. ssp.; 3: *C. (Archaeocarabus) lacertosus* n. sp.; 4: *C. (Rhigocarabus) impavidus* n. sp.

H o l o t y p u s ♀ : locus typicus, in coll. dell'autore.

D e s c r i z i o n e. Dimensioni: lunghezza totale, mandibole comprese, 25,7 mm. Larghezza massima delle elitre 8,9 mm. Colorazione perfettamente nera, relativamente lucida. Forma vigorosa.

Il capo è robusto, gli occhi molto grandi e sporgenti. La fronte, molto rilevata e liscia, ha i solchi profondi e rugosi, con della punteggiatura solo nella zona soprantennale. I margini laterali sono orlati ma poco rilevati. Il clipeo è indistinto dalla fronte, di forma rettangolare e molto trasversa, profondamente solcato ai lati e dotato di due setole. Il labbro è bilobato e abbastanza espanso lateralmente; sul lato anteriore è lievemente incavato. Il mento ha gli epilobi subacuti, il dente mediano molto breve e lungo meno della metà degli epilobi. Il submento è bisetolato. Le mandibole sono robuste e arcuate: il dente mediano del lato destro è più acuto del sinistro, i retinacoli sono bicuspidati e circa dello stesso sviluppo, ma quello destro è più stretto dell'altro. I palpi hanno l'estremità poco dilatata: i labiali sono dicheti. Le antenne sono normali, superano la base del pronoto con 4,5 articoli e oltrepassano di poco il primo terzo delle elitre. Lo scapo e i primi tre articoli sono moderatamente clavati; il 4° è molto più lungo del 2°, e, come il 3°, reca una corona di setole distali; dal 5° in poi sono tutti rivestiti di una fitta pubescenza fulva.

Il pronoto è molto grande e trasverso (rapp. $Lp/lp = 1,46$) e largo quasi quanto le elitre. I lati sono arcuati nel tratto anteriore, dove la maggiore ampiezza si trova a livello circa del terzo distale, per poi restringersi verso la base dove formano una discreta sinuosità. I lobi posteriori sono larghi e molto salienti, ma con l'estremità perfettamente arcuata. Il lato anteriore forma una lunga arcuatura, dall'orlo abbastanza ispessito, nella parte centrale; gli angoli anteriori sono chiaramente salienti. I margini sono orlati e molto rilevati, particolarmente nel tratto posteriore dove formano una vasta doccia. Il disco è molto convesso e finemente solcato dalla linea mediana. Le impressioni basali sono molto grandi e profonde. La superficie è dovunque rugosa e screpolata, ma sul disco tende a divenire quasi liscia. È presente una sola fovea laterale mediana priva di setola.

Le elitre sono allungate, più allargate nel tratto distale e con l'estremità un poco acuta e segnata da una lieve sinuosità latero-distale. Gli omeri sono indicati ma perfettamente arcuati. I margini sono sottilmente rilevati e formano una doccia abbastanza ampia. Il disco è normalmente convesso, la scultura, subomodinoma, è costi-

tuita da intervalli primari variamente interrotti in granuli e segmenti e da intermedi (secondari e terziari) ininterrotti e grandi quanto i primari. Le strie sono lisce. Mentre nell'area discale gli intervalli intermedi sono ininterrotti ma appena segnati da una lievissima crettatura trasversale, nelle aree laterali essi si riducono progressivamente di grandezza, la spezzettatura diviene più netta e la scultura si fa alquanto rasposa. Gli arti sono bene sviluppati e robusti.

D e r i v a t i o n o m i n i s . L'aspetto forte e robusto della nuova specie ha ispirato il nome che le è stato attribuito: *lacertosus* = muscoloso, vigoroso.

O s s e r v a z i o n i e n o t e . Nello stesso ambiente, a sud-ovest di Mianning, *C. lacertosus* convive con *C. (A..) dongchuanicus mianshanicus* Cavazzuti, 1996, specie dalla morfologia nettamente diversa e dal pronoto alquanto più ridotto, meno trasverso, con lati per nulla rilevati, appena ribordati, e con minuscoli lobi posteriori.

C. paris Breuning, 1932, che vive più a nord, nella valle di Bao-xing, è pure caratterizzato da un pronoto molto piccolo e dotato di angoli posteriori acuti. Nessuna relazione è pure ravvisabile nei confronti di *C. mianningensis* Kleinfeld, 1999, il quale, oltre ad avere dimensioni nettamente minori, ha una forma molto più raccolta ed il pronoto che non ha i lati rilevati nella maniera sopra descritta.

Nel gruppo di *C. nestor* Breuning, 1934 sono presenti alcuni taxa di forma molto più robusta e alquanto compatta, come pure nel gruppo di *C. morphocaraboides* Deuve, 1989 e di *bornianus* Hauser, 1922, nei quali però, oltre alla forma molto compatta e robusta, si è evoluto un cromatismo più acceso e vivace.

In conclusione ritengo che *C. lacertosus* possenga tutte le prerogative di una buona specie autonoma, ma soltanto il ritrovamento del maschio permetterà di far luce sulle sue reali affinità.

***Carabus (Piocarabus) vladimirskyi tianzhuiensis* n. nom.**

pro *Carabus (Piocarabus) vladimirskyi tianzhuiensis* Cavazzuti, 2006, preoccupato da *Carabus (Isiocarabus) kiukiangensis tianzhuiensis* Imura, 1996.

Come cortesemente mi ha tempestivamente comunicato il collega Helmut Schutze di Gleichen (Germania), che qui ringrazio per



5



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Figg. 5-8 - Habitus degli Holotypi dei nuovi taxa:

5: *C. (Cupreocarabus) laevithorax arduus* n. ssp.; 6: *C. (C.) lixianensis pseudomorettoi* n. ssp.; 7: *C. (Lamprostus) seroulikbin* n. sp.; 8: *C. (Coptolabrus) ishizukai hubeianus* n. ssp.

la segnalazione, il nome *tianzhuicus* da me proposto nel 2006 per una nuova sottospecie di *Carabus* (*Piocarabus*) *vladimirskyi* Dejean, 1830 cade in omonimia con *C.* (*Isiocarabus*) *kiukiangensis tianzhui-cus* Imura, 1996 e deve quindi essere emendato.

***Carabus* (*Rhigocarabus*) *impavidus* n. sp. (fig. 4)**

D i a g n o s i . Un *Rhigocarabus* di medie dimensioni, di aspetto relativamente gracile, vicino nella forma a *C. jintangicus* Deuve, 2001.

L o c u s t y p i c u s : Cina, Sichuan occidentale, Xiaojin, Passo a Nord di Fubian, 4550 m, Buma Shan, praterie alpine, 31°33'15"N, 102°24'67"E.

S e r i e t i p i c a : Holotypus ♂, locus typicus; Paratypi: 2 ♂♂, ibidem; 1 ♂, 1 ♀, stessi dati, ma 4180 m.) (tutti in coll. dell'autore).

D e s c r i z i o n e . Dimensioni: lunghezza totale, mandibole comprese, 17-19,5 mm. Larghezza massima delle elitre 6,8-7,2 mm. Colore bruno rameico scuro, un solo paratipo è di colore rameico più chiaro. Antenne e zampe nere, solo le tibie, le mandibole e i primi articoli delle antenne sono lievemente tinte di rosso. Forma snella nei due sessi.

Il capo è normale, gli occhi sono piccoli ma molto sporgenti e la fronte è poco rilevata e liscia. I solchi sono abbastanza profondi e debolmente rugosi, con qualche sottile ruga presente pure sul collo; le carene laterali sono spesse ma quasi per nulla orlate. Il clipeo è indistinto e perfettamente saldato con la fronte. Il labbro è poco espanso lateralmente e fortemente incavato sul lato anteriore. Il mento ha gli epilobi acuti ed il dente mediano un poco più breve ma acutissimo; il submento è dicheto. Le mandibole sono piccole e brevi, un poco irregolarmente arcuate, ed hanno il dente mediano destro piccolo ma ben distinto e i retinacoli bicuspidati; quello destro però è lungo il doppio del sinistro e largo solo la metà. I palpi hanno l'ultimo articolo pochissimo dilatato e uguale nei due sessi; il penultimo articolo dei labiali reca due setole basali. Le antenne sono brevi e nodose, superano nel ♂ la linea basale del pronoto con 4,5 articoli, 4 nella ♀, ma non raggiungono la metà delle elitre. Lo scapo è breve, tozzo

e un poco ricurvo, il 2° articolo è poco più breve del 4°, ma è più clavato; il 3° e il 4° hanno una corona distale di setole, e dal 5° in poi sono tutti uniformemente rivestiti di fitta pubescenza fulva. Gli articoli dal 5° al 9° del ♂ hanno un'incavatura glabra sul lato inferiore.

Il pronoto è poco trasverso e alquanto piccolo (rapp. $Lp/lp = 1,31$); i lati sono arcuati nel tratto anteriore, dove oltre la metà è situata la maggior ampiezza, e, verso la base, molto debolmente sinuati e un poco ristretti. Gli angoli posteriori sono piccoli e dentiformi, salienti e smussati. I margini laterali sono sottilmente orlati e rilevati; il lato anteriore, nel tratto mediano, ha una lieve orlatura. Il disco è mediamente convesso, la linea mediana è profondamente impressa e le fossette posteriori sono brevi ma profonde. La superficie discale è liscia ma screpolata lungo la linea mediana e tende a divenire granulosa e rugosa nelle aree laterali. Sono due le setole di ciascun lato: una basale e una mediana. Il prosterno è liscio, le propleure sono a lustro metallico liscio e bronzeo.

Le elitre formano un ovale molto allungato, con gli omeri sfuggenti e pochissimo marcati. La maggior ampiezza è situata presso il terzo distale. Il disco è molto convesso e la scultura, di tipo eterodinamo triploide, è costituita da intervalli primari in serie di granuli, profondamente interrotti da grosse fossette, che predominano sul resto della scultura; questa è formata da sette serie di granuli più o meno allineati e uguali fra loro. Gli sterniti non sono solcati.

Gli arti sono robusti e di normale sviluppo. Quattro protarso-meri, nel maschio, sono dilatati e provvisti di fanere adesive.

Edeago (figg.16-17). Il lobo mediano è sottile nel tratto basale e moderatamente ingrossato nella parte mediana, con la lama apicale allungata, digitiforme e lievemente ricurva verso l'alto in visione laterale. In visione dorsale (fig. 16) l'apice mostra un distinto orientamento a destra.

Derivatio nominis. L'ambiente dal quale proviene la nuova specie, difficile ed in forte pendenza, gli ha valso il nome specifico attribuito: *impavidus* = senza paura.

Osservazioni e note. L'aspetto snello e la morfologia generale fanno avvicinare *C. impavidus* a *C. jintangicus* (diffuso sul massiccio dei Jia Jin Shan in ambienti analoghi), ma un esame accurato dimostra che si tratta di due buone specie, nettamente separate.

In *C. jintangicus* la parte superiore del capo è molto e profon-



9



10



11

Figg. 9-11 - Habitus degli Holotypi dei nuovi taxa:

9: *Cychrus toledanoi* n. sp.; 10: *C. toledanoi maerkangensis* n. ssp.; 11: *C. bruggei lianghensis* n. ssp.

damente rugosa ed il labbro è più dilatato lateralmente. Il pronoto, che è moderatamente convesso e quasi liscio in *impavidus*, è caratteristicamente ammaccato, depresso e fortemente rugoso in *jintangicus*, nel quale i margini del pronoto sono anche molto spessi e rilevati e privi di setole basali. Le elitre nelle due specie sono sostanzialmente simili, ma gli organi genitali maschili differiscono molto nella forma della lama apicale.

Con *C. xiei* Deuve, 1992, diffuso nella zona di Barkam con le ssp. *barkamensis* Deuve, 1994 e *proximior* Deuve, 1997, esistono pure limitate affinità morfologiche, però in *xiei* il capo è più grande, il pronoto più trasverso e meno ristretto posteriormente, i margini molto più rilevati e le fossette basali molto più grandi; nelle elitre, peraltro molto simili, gli intervalli quaternari sono ridotti a tracce vestigiali. L'edeago è simile nella struttura del lobo mediano, ma la lama apicale è più lunga e sottile. La sola femmina nota di *C. impavidus* ha un aspetto slanciato, esattamente come i maschi della sua specie, in contrasto con l'aspetto alquanto tarchiato delle femmine di *C. xiei*, comprese le sue sottospecie.

***Carabus (Cupreocarabus) laevithorax arduus* n. ssp. (fig. 5)**

L o c u s t y p i c u s: Cina, Sichuan occidentale, Xiaojin, Passo a Nord di Fubian, 4550 m, Buma Shan, praterie alpine, 31°33'159N, 102°24'679E.

S e r i e t i p i c a: Holotypus ♂, locus typicus; Paratypi: 11 ♂♂, 10 ♀♀, ibidem; 2 ♂♂, 1 ♀, stessi dati eccetto 4150 m, 31°32'017N, 102°26'405E, conservati nella collezione del MSNG e dell'autore.

D e s c r i z i o n e. Dimensioni: lunghezza totale, mandibole comprese, 17,8-22,4 mm. Larghezza massima delle elitre 6,7-8,2 mm. Colorazione di registro particolarmente scuro: la parte dorsale è nera con riflessi azzurri o verdi in tutti gli esemplari della quota più elevata, tranne uno, che è di colore bronzeo con riflesso verde, mentre i tre esemplari provenienti dalla quota minore sono bronzati, e marginati di verde nella ♀; gli scapi e i primi quattro articoli antennali, i femori e le articolazioni delle tibie sono di colore rosso ocraceo. I tegumenti sono molto lucidi nel ♂, un po' meno brillanti sulle elitre della ♀. Forma elegante e slanciata nel ♂, più breve e con le elitre dilatate nella ♀.

Nei confronti di *C. laevithorax sinuati* Deuve (2005) endemico della valle orientale più prossima, la nuova sottospecie ha una forma più tozza e breve nel ♂, e decisamente più allargata nella ♀. Il capo è proporzionalmente più macrocefalo, ha gli occhi più ridotti e meno sporgenti, la fronte pressoché liscia e impuntata. Le antenne sono più brevi raggiungendo appena il primo terzo delle elitre nel ♂, solo il primo quarto nella ♀. Il pronoto è meno sinuato, ha margini più spessi e gli angoli posteriori quasi inesistenti e arrotondati. Il disco è più convesso e liscio. Sono presenti da 2 a 6 setole laterali distribuite nella metà distale, più 1 basale su ciascun lato.

Le elitre sono ovalari e decisamente meno allungate, possiedono una scultura nettamente omodinamica triploide, abbastanza forte, formata da intervalli primari in granuli allungati e dominanti, intercalati da punti profondi e metallici; i secondari sono in cordolature sottili e continue, grandi la metà dei primari; i terziari sono grandi come i secondari ma meno rilevati, e sovente sono spezzettati in granuli. Le strie sono punteggiate.

L'edeago (figg. 18-19) è poco differenziato da quello della forma tipica, rispetto al quale ha l'apice appena un poco più troncato obliquamente.

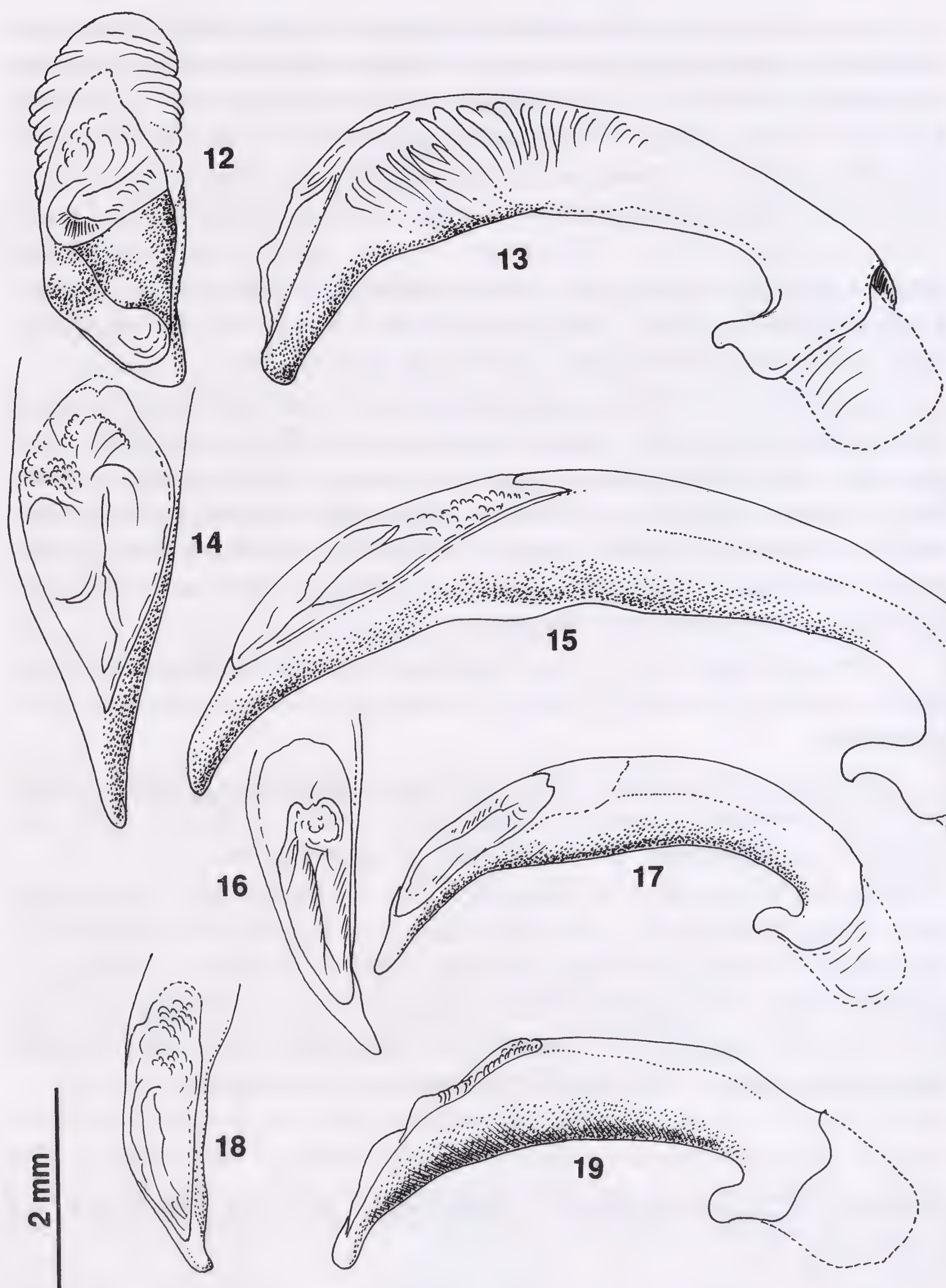
Derivatio nominis. *Arduus*, l'aggettivo latino utilizzato per nominare la nuova sottospecie, è stato utilizzato nella sua accezione più naturale, cioè: difficile da raggiungere.

Osservazioni e note. Le caratteristiche fenotipiche della nuova sottospecie, come la colorazione nera lucente sfumata di azzurro o di verde, gli scapi e i femori rossicci, e l'elevato numero di setole pronotali, la rendono immediatamente riconoscibile, non solo dalle altre sottospecie di *C. laevithorax* Breuning, 1935, ma anche da tutte le altre specie dell'intero sottogenere *Cupreocarabus*.

***Carabus (Cupreocarabus) lixianensis pseudomorettoi* n. ssp.** (fig. 6)

Locus typicus: Cina, Sichuan occidentale, Xiaojin Xian, circa 20 km N. di Lianghekou, 3500 m, foresta di conifere.

Serie tipica: Holotypus ♂, locus typicus, in coll. dell'autore. Paratypi: 12 ♂♂, 8 ♀♀, ibidem, conservati nelle coll. Ghiretti e dell'autore.



Figg. 12-19 - Lobo mediano dell'edeago degli holotypi ♂♂ in visione dorsale e laterale. 12-13: *Carabus (Apotomopterus) mecynodes mitis* n. ssp.; 14-15: *C. (A.) patroclus xinshibanus* n. ssp.; 16-17: *C. (Rhigocarabus) impavidus* n. sp.; 18-19: *C. (Cupreocarabus) laevithorax arduus* n. ssp.

D e s c r i z i o n e . Dimensioni: lunghezza totale, mandibole comprese, 22-25,2 mm. Larghezza massima delle elitre 7,3-8,5 mm. La colorazione è bronzea, discretamente metallica, con chiari riflessi rameici sul capo e talora anche sul pronoto; tibie, palpi e antenne sono rossicce.

La forma è prossima sia alla sottospecie tiponominale che, seppure in misura molto minore, alla ssp. *shuanqiaoensis* Cavazzuti, 2003, ma da entrambe è distinta per i seguenti caratteri: mandibole più sottili; fronte alquanto più fittamente rugosa e punteggiata; pronoto molto trasverso (rapp. $L_p/l_p = 1,40$), più minutamente rugoso e punteggiato, con i lobi posteriori più lunghi e arrotondati e dotato di tre setole nella metà distale più una basale. Le elitre corrispondono a quelle della ssp. *lixianensis* Deuve, 1990, ma gli intervalli primari sono maggiormente predominanti, i secondari continui e un po' meno rilevati, e i terziari in serie di granuli; in alcuni casi i granuli terziari sono ridotti e affiancati da serie disordinate di granuli quaternari. Mentre nella forma tipica gli arti sono sovente neri o nerastri, in *pseudomorettoi* le tibie sono rossicce.

Edeago (figg. 20-21) molto più vicino a quello della ssp. tipica che a quello di *shuanqiaoensis*. La lama apicale è molto breve e per nulla ricurva, in visione dorsale si presenta triangolare e brevissima, con l'estremità che accenna appena ad una flessione a destra.

D e r i v a t i o n o m i n i s . La reale somiglianza con *C. morettoi* Deuve, 1997, con il quale peraltro è sintopico ed era stato confuso, ha ben meritato al nuovo taxon il nome attribuito.

O s s e r v a z i o n i e n o t e . *C. lixianensis pseudomorettoi* è stato riscontrato sintopico, nella località tipica, con *C. morettoi* Deuve, 1997, dal quale è pressoché indistinguibile nella morfologia esterna, ma la diversità esistente nella struttura dei rispettivi organi genitali maschili è talmente evidente che la separazione degli individui di questo sesso non pone alcun problema. Ben altre problematiche s'incontrano nella separazione degli esemplari di sesso femminile, la cui attribuzione all'una o all'altra specie, sulla scorta dei soli caratteri esoscheletrici, è abbastanza aleatoria, com'è dimostrato dalla presenza, fra la serie tipica di *morettoi*, di esemplari appartenenti certamente a *pseudomorettoi*.

Più a nord, sui pascoli della zona assiale della catena dei Qionglai Shan, è infeudato *C. brezinai* Deuve, 1994, dall'aspetto molto peculiare e assolutamente inconfondibile con *lixianensis pseudomoret-*

toi. A ovest s'incontra *C. laevithorax arduus* Cavazzuti, di cui si è sopra discusso, e nella zona di Jinchuan Xian *C. lixianensis jinchuanicus* Deuve, 2007 di recente descrizione, il quale però presenta un edeago alquanto più lungo e affilato.

Fra le specie di *Cupreocarabus* presenti nella valle di Shuangqiao, localizzata poco più a est (*laevithorax* Breuning, 1935, *miroslavi* Deuve, 2000 e *lixianensis shuangqiaoensis* Cavazzuti), le prime due appartengono ad altre linee filetiche, come viene suggerito dalle diverse strutture degli organi copulatori, *C. lixianensis shuangqiaoensis* è invece così particolare e differenziato nella morfologia edeagica, dall'apice decisamente flesso a destra, unico nell'ambito specifico, da mettere in dubbio la sua appartenenza a *C. lixianensis*, a favore della sua elevazione a specie autonoma.

***Carabus (Lamprostus) seroulikbin* n. sp.** (fig. 7)

D i a g n o s i . Un *Lamprostus* nero, semilucido, piuttosto grande, che ricorda indubbiamente sia *C. guycolasianus* Deuve, 2001 che *staveni* Heinz, 2002, ma di forma notevolmente più allargata ed appiattita.

L o c u s t y p i c u s : Iran occidentale. P. Azerbaigan-e Garbi, 4 km a est di Likbin, 1660-1700 m, 36°44' N, 45°28' E.

S e r i e t i p i c a : Holotypus ♂, locus typicus, 21-04/25-04-2002, J. Procházka legit, in coll. dell'autore; Paratypi: 15 ♂♂, 12 ♀♀, ibidem, nelle coll. Procházka e dell'autore; 10 ♂♂, 8 ♀♀, Iran occidentale. P. Azerbaigan-e Garbi, 12 km a sud di Serou, 1950-2000 m, 37°38' N, 44° 43' E, 26-04/29-04-2002, J. Procházka legit, nelle coll. E. Hajdaj, J. Kalab, J. Procházka e dell'autore.

D e s c r i z i o n e . Dimensioni: lunghezza totale, mandibole comprese, 28-33 mm. Larghezza massima delle elitre 9,8-12 mm. Colorazione perfettamente nera, semilucida, con qualche vaghissima traccia di azzurro sui margini elitrali di alcuni esemplari. Forma robusta e pochissimo convessa.

Il capo è di grandezza normale per il sottogenere, con gli occhi grandi e mediamente sporgenti. Il vertice della fronte è rilevato e liscio, i solchi sono poco profondi ma segnati e tendenti a congiungersi nella parte posteriore, perdendosi però nell'area mediana, dove peraltro sono presenti alcune rughe che si estendono anche al collo.

Il clipeo è liscio, di forma chiaramente trapezoidale, e non presenta tracce della sutura frontale. Sono presenti due setole all'estremità anteriore dei solchi. Il labbro è piccolo, con lobi pochissimo espansi lateralmente, e moderatamente incavato sul lato anteriore; dispone di una setola su ciascun lobo e di una piccola frangia anteriore di setole. Il mento ha gli epilobi eccentricamente acuti, con l'apice situato sul margine interno, col quale forma un angolo quasi retto; il dente mediano è molto largo e sviluppato, arrotondato, e lungo il doppio degli epilobi. La superficie è solcata da numerose rughe longitudinali. Il submento è privo di setole. Le mandibole sono brevi e robuste, arcuate sul lato esterno e smussate all'estremità. Il dente mediano destro è poco sviluppato, ma sempre più evidente del sinistro; i retinacoli sono larghi e bicuspidati, ma si presentano molto consumati. I palpi sono brevi ed hanno gli articoli terminali poco dilatati, larghi all'estremità il doppio che alla base; nei mascellari il penultimo palpomero è sviluppato quanto l'ultimo; i labiali sono dotati di 8-10 setole, distribuite sia singolarmente sia a ciuffi di 2 o 3. Le antenne sono molto brevi, non raggiungono il quarto delle elitre nel ♂ e superano la base del pronoto con appena tre articoli nella ♀, 3,5 nel ♂; lo scapo è breve e tozzo e dotato di una setola; gli articoli 2° e 4° sono debolmente clavati, il 2° è lungo circa quanto il 4°. Quest'ultimo è dotato di alcune setole disposte a corona, ma dal 5° in poi tutti gli articoli sono rivestiti di scarsa pubescenza fulva.

Il pronoto è molto trasverso (rapp. $Lp/lp = 1,39♂, 1,49♀$), ha i lati arcuati, non sinuati e poco ristretti posteriormente. La base è lievemente arcuata e continua con gli angoli posteriori, i quali sono arrotondati e quasi per nulla salienti. I margini sono sottilmente orlati e pochissimo rilevati. Il disco è molto convesso, perfettamente liscio, con una fitta punteggiatura limitata solo alla parte basale, ma a volte può presentarsi completamente screpolato e punteggiato nella parte basale. La linea mediana è lieve, le impressioni deboli, puntiformi e localizzate sugli angoli posteriori.

Le elitre sono ovalari, allungate, ben allargate e arrotondate agli omeri, ed hanno la maggiore ampiezza situata poco oltre la metà. I margini sono sottili, rilevati, e formano una doccia abbastanza larga. La superficie, da molto poco convessa, o addirittura subpiana sul disco, diviene fortemente declive sui margini. La scultura è formata da una minutissima punteggiatura, più o meno allineata in serie longitudinali parallele.

Le zampe sono robuste ma non molto sviluppate. Nei maschi solo i primi tre protarsomeri sono dilatati e provvisti di spazzole di fanere adesive.

L'edeago (figg. 22-23) presenta un lobo mediano robusto e poco ricurvo. In visione laterale sono visibili la callosità del tratto basale, la dilatazione del tratto mediano e la forma della lama apicale, che è appiattita, larga e allungata, con l'estremità perfettamente arrotondata. In visione dorsale si nota la particolare struttura, il risvolto predistale della parte chitinizzata inferiore e la netta flessione verso destra.

D e r i v a t i o n o m i n i s . Il nome della nuova specie, su suggerimento del suo fortunato scopritore, è formato dall'unione dei toponimi delle due località dalle quali proviene la serie tipica: Serou e Likbin.

O s s e r v a z i o n i e n o t e . Come già è stato accennato nella diagnosi, la nuova entità presenta alcune affinità con le specie di *Lamprostus* iraniane di maggiori dimensioni: *guycolasianus* e *staveni*.

Ma in *C. guycolasianus*, compresa la ssp. *colorescens* Deuve, 2001, in visione dorsale l'edeago si presenta diritto e non flesso a destra; inoltre, sul piano morfologico, *guycolasianus* possiede impressioni pronotali molto più vaste e profonde, e le elitre, molto più convesse, hanno gli omeri completamente sfuggenti. *C. staveni* ha il capo più tozzo e breve, il pronoto più squadrato, con gli angoli posteriori in lobi arrotondati, ed il disco fortemente screpolato. Anche in *C. staveni* le elitre sono più convesse e meno dilatate, gli omeri più sfuggenti, e la loro maggior ampiezza è situata presso la metà.

C. calleyi Fischer, 1823, specie presente a breve distanza, poco oltre il confine turco con la ssp. *machardiellus* Deuve, 1991, è un'entità di forma molto diversa, che inoltre presenta misure di gran lunga inferiori; ha il protorace molto largo e decisamente ristretto alla base e le elitre nettamente più dilatate agli omeri. In *C. calleyi machardiellus*, inoltre, l'edeago è ben differenziato nella struttura.

Nei confronti con le specie presenti nell'area siriano-giordana: *C. syrus* Roeschke, 1898, *C. hemprichi* Dejean, 1826, ecc., pur in qualche caso relativamente affini nella morfologia esoscheletrica, le reali e fondamentali differenze presenti fra gli organi riproduttori maschili, sono talmente evidenti che fanno escludere a priori ogni possibilità di vicinanza specifica.

***Carabus (Coptolabrus) ishizukai hubeianus* n. ssp.** (fig. 8)

Locus typicus: Cina centrale. West Hubei, Muyuping Sud, 1300 m, 31°45'N, 110°4'E.

Serie tipica: Holotypus ♂, locus typicus, 16-05/12-06-2004, in coll. dell'autore. Paratypi: 1 ♂, 2 ♀♀, stessi dati; 1 ♀, ibidem, eccetto: 20-06/12-07-2003; 3 ♂♂, 2 ♀♀, ibidem, eccetto: 21-05/06-06-2005, 31°05'N, 110°35'E; 7 ♂♂, 2 ♀♀, West Hubei, Guanmenshan, 1500 m, 16-05/14-06-2004, 31°45'N, 110°04'E; 4 ♂♂, 3 ♀♀, West Hubei, road Xingshan-Badong, 5 km N. Gauchou, 1500 m, 19-05/12-06-2004, 31°02'N, 110°05'E. I paratypi sono conservati nelle collezioni Turna e dell'autore.

Descrizione. Dimensioni: lunghezza totale, mandibole comprese, 35,3-37,6 mm. Larghezza massima delle elitre 12,2-14,4 mm. La colorazione è bruna nerastra sulle elitre, con una sottile fascia marginale molto brillante, rameica tendente al dorato; capo e pronoto di colore rameico abbastanza scuro, un poco più vivace sui margini. Zampe, antenne e parti inferiori nere, ad eccezione delle propleure ed epipleure, che sono rameiche. Forma relativamente snella.

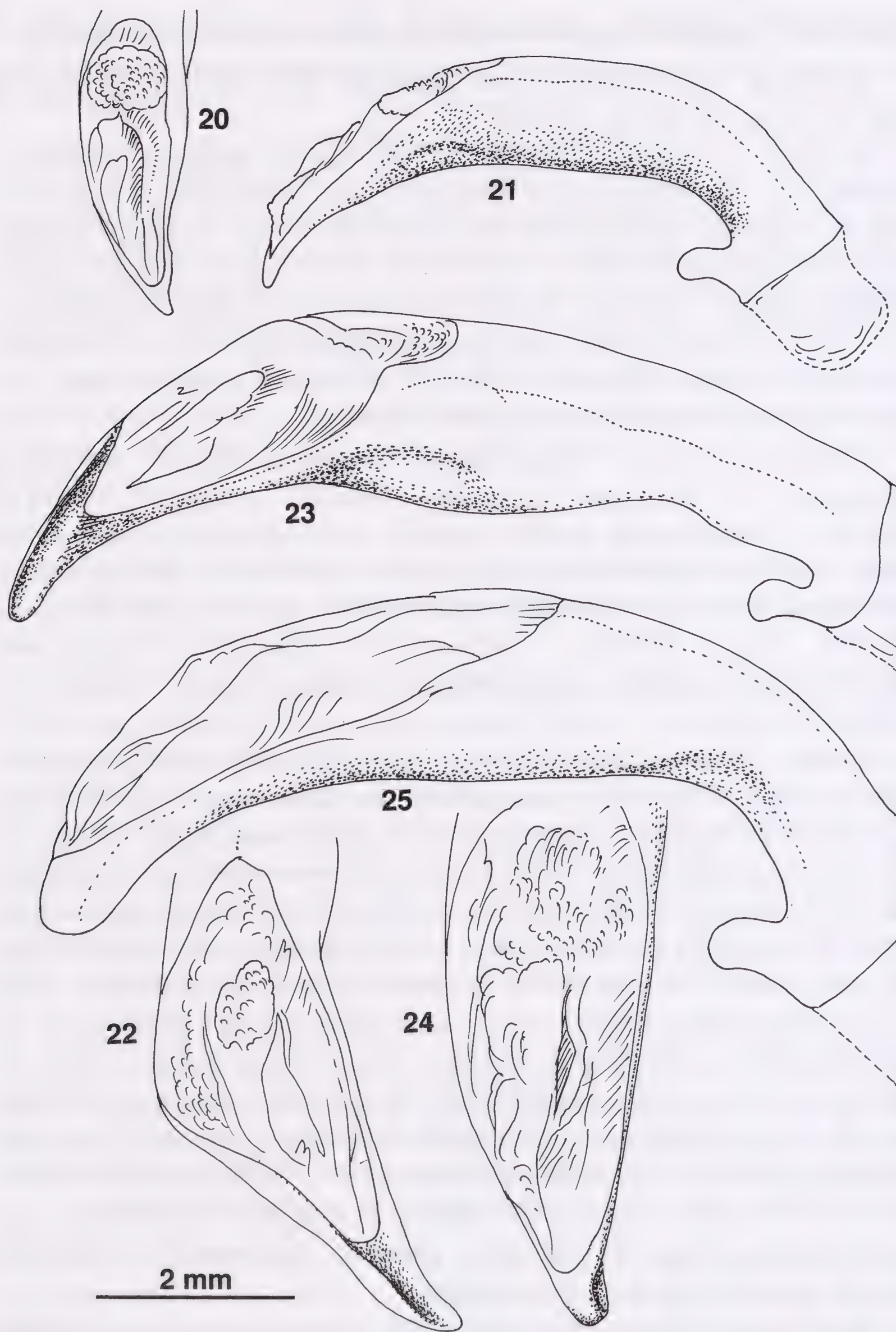
Il capo è praticamente identico a quello della forma tiponomiale: soltanto il labbro è più profondamente incavato sul lato anteriore. Il pronoto (rapp. $L_p/l_p = 1,19$) è arcuato nel tratto anteriore e non forma quegli angoli mediani chiaramente evidenti che caratterizzano la forma tipica. Gli angoli posteriori sono ottusi e poco divergenti. Il disco è pressoché liscio e privo della depressione trasversale che caratterizza la sottospecie *ishizukai* Deuve & Ohshima, 1990.

Le elitre sono ovalari molto convesse, con gli omeri quasi del tutto sfuggenti e terminanti con due mucroni appena accennati. La scultura è molto simile a quella della forma tipica ma meno confusa, con gli intervalli primari e secondari in forma di goccia, ben isolati e lucidi sul fondo lievemente bulinato e opaco. Gli intervalli terziari sono presenti qua e là, in allineamenti di minutissimi granuli.

L'edeago (figg. 24-25) non presenta apprezzabili differenze rispetto a quelli dei taxa conspecifici.

Derivatio nominis. La nuova sottospecie prende il nome dalla provincia dell'Hubei, dov'è stata rinvenuta.

Osservazioni e note. Mentre *C. (Coptolabrus) ishizukai* proviene dal Chongqing occidentale (Wushan, Xinfeng),



Figg. 20-25 - Lobo mediano dell'edeago degli holotipi ♂♂ in visione dorsale e laterale.
 20-21: *C. (Cupreocarabus) lixianensis pseudomorettoï* n. ssp.; 22-23: *C. (Lamprostus) seroulikbin* n. sp.; 24-25: *C. (Coptolabrus) ishizukai hubeianus* n. ssp.

il nuovo taxon *hubeianus* proviene dall'Hubei occidentale, presso il massiccio del Dashennonjia. Sul piano morfologico le due sottospecie si differenziano principalmente per la forma più slanciata di *hubeianus*, nella quale gli omeri sono più ristretti, per i mucroni elitrali più ridotti, per il pronoto di forma più arcuata, quasi priva delle angolosità mediane caratteristiche della ssp. *ishizukai*, e per la colorazione rameica dei margini elitrali, invece del verde brillante della forma tiponominale.

***Cychrus toledanoi* n. sp.** (fig. 9)

D i a g n o s i . Un *Cychrus* di ridotte dimensioni, morfologicamente molto vicino a *C. stoetznerei* Roeschke, 1923, ma con il pronoto molto più largo e dotato di una sola lunga setola mediana.

L o c u s t y p i c u s : Cina, Sichuan occidentale, Xiaojin, valle di Fubian, 3600 m, Buma Shan.

S e r i e t i p i c a : Holotypus ♂, locus typicus; Paratypus: 1 ♂, ibidem, conservati nella collezione dell'autore.

D e s c r i z i o n e . Dimensioni: lunghezza totale, mandibole comprese, 14,5-15 mm. Larghezza massima delle elitre 5-5,2 mm. Colore nero lucido, ad eccezione delle mandibole e delle parti boccali, della base degli antennumeri 2°-3°-4°, e dell'estremità dei palpi, che sono rossicce.

Il capo è normale, un po' grande, con la fronte rilevata e quasi liscia. Il solco curvilineo interoculare è completo, benché molto attenuato nel centro. Gli occhi sono grandi ma poco sporgenti, le carene laterali sono orlate e molto rilevate, il clipeo è liscio, il labbro possiede due lobi molto allungati che raggiungono la base dei primi denti. Gli epilobi del mento sono lunghi e arrotondati. Le mandibole sono sottili e di normale sviluppo, dotate di due denti interni, fra i quali quello basale possiede un dente supplementare rudimentale. I palpi sono dilatati, all'estremità i labiali sono larghi quasi il doppio dei mascellari; il penultimo articolo dei labiali reca 3 setole: 1 basale e 2 distali gemelle. Le antenne sono abbastanza sviluppate (purtroppo sono incomplete in entrambi gli esemplari) e superano la base del pronoto con 5 segmenti. Lo scapo è lungo e clavato con una setola dorsale, il 2° articolo è molto più sviluppato del 4°, ma

solo quest'ultimo è provvisto di alcune setole a corona; dal 5° in poi sono tutti rivestiti di breve e scarsa pubescenza.

Il pronoto è trasverso, ampiamente arrotondato, cordiforme e fortemente ristretto alla base, dove gli angoli sono ottusi. Il lato anteriore è arcuato, molto più esteso di quello basale, e nella parte centrale ha un risvolto molto largo e spesso. I lati sono appena rilevati e recano due lunghe setole sulla metà. Il disco è convesso, molto meno declive nella parte anteriore che in quella posteriore, dov'è pure presente una depressione trasversale confluyente con la linea mediana. Tutta la superficie è punteggiata.

Le elitre sono ovalari e abbastanza larghe, dilatate agli omeri e tuttavia perfettamente arcuate, con l'estremità apicale appena un po' appuntita. Il disco è scarsamente convesso, ma esteriormente al terzo intervallo primario diviene improvvisamente subverticale. La scultura è eterodinama, formata da intervalli primari in serie di granuli o segmenti, relativamente grandi e rilevati; i secondari sono in granuli grandi quanto i primari, o poco meno, mentre il fondo elitrare è completamente ricoperto da una granulosità irregolare e scarsamente allineata, che nel declivio anteriore viene sostituita da una forte punteggiatura. Propleure, prosterno e mesosterno sono punteggiati; nelle epipleure la punteggiatura è maggiormente marcata. Gli sterniti sono lisci.

Gli arti sono di normale sviluppo. Solo i primi due protarsomeri sono moderatamente dilatati e provvisti di fanere adesive sul lato inferiore.

Edeago (figg. 26-27) molto arcuato, breve, piuttosto robusto e affilato all'estremità. In visione dorsale l'apice appare acutissimo e dotato di margini molto sottili.

Derivatio nominis. La nuova interessante specie è cordialmente dedicata all'amico Luca Toledano, appassionato e valente specialista del difficile gruppo dei Carabidi Bembidiini.

Osservazioni e note. *Cychrus toledanoi* n. sp. è vicino al gruppo *bruggei/stoetzneri*, con i quali condivide l'ampiezza del pronoto e la scultura elitrare, ma *C. bruggei* ha il pronoto maggiormente allungato, più convesso e chiaramente sinuato, le elitre sono ugualmente appiattite ma descrivono un ovale più regolare ed hanno la scultura decisamente meno forte e priva di intervalli secondari. *Cychrus stoetzneri* Roeschke, 1923 è di forma meno robusta,

ma le elitre hanno una scultura sostanzialmente analoga; tuttavia sul pronoto, meno convesso e fortemente punteggiato, sono presenti un elevato numero di setole marginali. In *C. stoetzneri*, inoltre, l'edeago è molto più sottile in visione dorsale, ma l'estremità è più larga e arrotondata.

Con *C. thibetanus* Fairmaire, 1893, che possiede un pronoto abbastanza simile e dotato di una sola setola latero-mediana, *C. toledanoi* è distinguibile per il pronoto ancora più ampio, fortemente ristretto alla base, ma quasi per nulla sinuato, e per le elitre squadrate e molto allargate agli omeri, completamente diverse dalla forma ovalare e con gli omeri sfuggenti, tipica delle elitre di *C. thibetanus*.

***Cychrus toledanoi maerkangensis* n. ssp.** (fig. 10)

Locus typicus: Cina, Sichuan occidentale, Monti a N-Nordovest di Barkam, 4000-4600 m.

Serie tipica: Holotypus ♂, locus typicus, foresta di conifere; Paratypus: 1 ♀, ibidem, 4300-4600 m, praterie alpine.

Descrizione. Dimensioni: lunghezza totale, mandibole comprese, 13,8-14 mm. Larghezza massima delle elitre 4,4-4,6 mm. Colorazione nera, abbastanza lucida e appena bronzata.

Rispetto alla forma tiponominale le dimensioni sono lievemente ridotte e l'aspetto un poco più gracile, il capo è più minuto, la fronte meno pronunciata ed è appena più punteggiata. Anche le mandibole sono più brevi.

Il pronoto, meno ampio e meno convesso, dispone, come in *C. toledanoi*, di una sola lunga setola latero-mediana. Le elitre formano un ovale più stretto e sono meno dilatate agli omeri. L'edeago (figg. 28-29) è pressoché indifferenziato.

Derivatio nominis. Il nome attribuito deriva dall'antico nome tibetano di Barkam: Maerkang.

Osservazioni e note. *Cychrus toledanoi maerkangensis* è distinto dalle varie sottospecie di *C. stoetzneri* Roeschke, 1923 che vivono nella regione, compresa la ssp. *maoerganicus* Deuve & Tian, 2007, soprattutto per la forma del pronoto, più convessa e più ristretta posteriormente, con gli angoli anteriori piccoli ma nettamente salienti, e per la presenza di una sola lunga setola latero-

mediana. In *C. stoetzneri* i margini del pronoto recano sempre un numero di setole marginali molto più elevato, normalmente da 3 a 5, che di solito sono molto brevi.

Inoltre è anche distinto da *C. inops* Deuve, 1997 per il minore allungamento del capo e per la forma del pronoto non ristretta nella parte anteriore.

***Cychrus bruggei lianghensis* n. ssp. (fig. 11)**

L o c u s t y p i c u s: Cina, Sichuan occidentale, Xiaojin Xian, circa 20 km a Nord di Lianghe, foresta di conifere, 3500 m.

S e r i e t i p i c a: Holotypus ♂, locus typicus; Paratypi: 5 ♂♂, 4 ♀♀, ibidem, conservati nella collezione dell'autore.

D e s c r i z i o n e. Dimensioni: lunghezza totale, mandibole comprese, 16,9-19 mm. Colorazione nera, poco lucida, solo le parti boccali sono rossicce.

La forma è slanciata ma robusta. Il capo si presenta molto stretto e allungato, con gli occhi lenticolari, pochissimo rilevati, la fronte molto saliente e liscia, il solco curvilineo posteriore svanito nella parte mediana e le mandibole sviluppatissime.

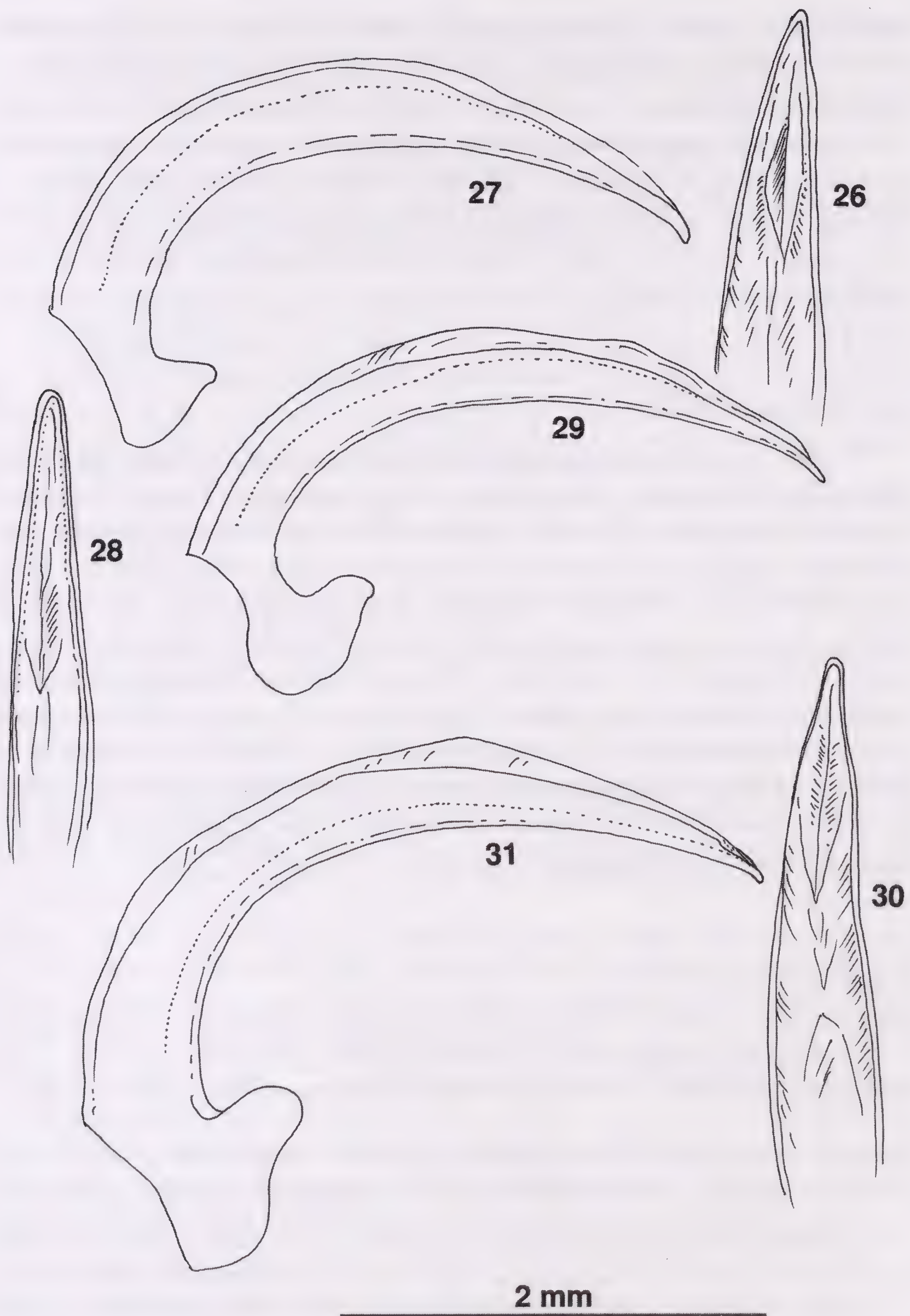
Il pronoto è allungato, poco trasverso, ristretto sia anteriormente sia posteriormente, con i lati arcuati, orlati, ma pochissimo rilevati, e dotati di 3-4 setole per lato, localizzate tutte nella metà distale. Il disco è convesso e fittamente punteggiato.

Le elitre sono ovalari, con gli omeri sfuggenti nel ♂, mentre nella ♀ sono talora molto marcati. Il disco è pochissimo convesso; la scultura è costituita da un fondo grossolanamente granuloso, dal quale emergono le serie dei granuli primari, normalmente poco rilevati, e, talvolta anche le tracce vestigiali dei secondari. I protarsi del ♂ non sono dilatati e sono sprovvisti di fanere adesive.

L'edeago (figg. 30-31) si presenta poco differenziato rispetto a quello della forma tipica.

D e r i v a t i o n o m i n i s. Dal toponimo della località nei dintorni della quale sono stati reperiti gli esemplari esaminati.

O s s e r v a z i o n i e n o t e. Da *C. bruggei barkamensis* Deuve, 1991, diffuso sul versante settentrionale e sulla sommità del Qionglai Shan (Monti a Sud Est di Barkam), la nuova ssp. *lianghensis*



Figg. 26-31 - Lobo mediano dell'edeago degli holotypi ♂♂ in visione dorsale e laterale.
 26-27: *Cychrus toledanoi* n. sp.; 28-29: *C. toledanoi maerkangensis* n. ssp.; 30-31: *C. bruggei lianghensis* n. ssp.

è separabile, a colpo d'occhio, per il pronoto più stretto, più convesso, meno fortemente punteggiato e per la scultura meno forte delle elitre, oltre, naturalmente, che per le dimensioni decisamente più cospicue.

Dalla ssp. *microthorax* Deuve, 1992, presente nella vicina valle di Shuangqiao, è distinto pure per la forma molto più grande e robusta, opaca e non lucidissima come in *microthorax*, per il pronoto meno convesso e per le elitre meno slanciate e dotate di una scultura più profonda.

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BIBLIOGRAFIA

- BREUNING S. von, 1932 - Monographie der Gattung *Carabus* L. - Bestimmungstabellen der europäischen Coleopteren, Troppau, 104: 3-288.
- BREUNING S. von, 1933 - Zehn neue asiatische Caraben - *Entom. Nachr.*, Troppau, 7: 21-27.
- BREUNING S. von, 1934 - Ueber Carabini - *Folia zool. hydrob.*, Riga, 6: 29-40.
- CAVAZZUTI P., 1996 - Quinto contributo alla conoscenza dei *Carabus* L. della Cina. Su *C. Apotomopterus* del gruppo *delavayi-patroclus*, con descrizione di tre nuove sottospecie. (Coleoptera, Carabidae) - *Lambillionea*, Tervuren, 96 (4): 589-596.
- CAVAZZUTI P., 1997a - Nuovi Carabini della Cina II. Descrizione di nuovi *Cychrus* Fabr. e *Carabus* L. del Sichuan meridionale (Coleoptera, Carabidae) - *Nouv. Rev. Ent.* (N.S.), Paris, 14 (3): 217-227.
- CAVAZZUTI P., 1997b - Descrizione di nuovi *Cychrus* F. e *Carabus* L. delle provincie di Sichuan, Yunnan e Guizhou, Cina meridionale (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 3 (4): 47-76.

- CAVAZZUTI P., 1999 - Sesto contributo alla conoscenza dei *Carabus* L. della Cina. Descrizione di nuove specie e sottospecie dello Shaanxi, Sichuan e Yunnan (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 5 (7): 115-137.
- CAVAZZUTI P., 2003 - Sui Carabini della Cina (IV nota). Descrizione di tre nuove sottospecie del genere *Carabus* delle provincie di Shaanxi, Sichuan e Tibet. (Coleoptera, Carabidae) - *Lambillionea*, Tervuren, 104 (3): 413-417.
- CAVAZZUTI P., 2006 - Nuovi *Carabus* delle regioni montagnose della Cina, province di Gansu e Qinghai settentrionale (Coleoptera, Carabidae) - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 98: 135-155.
- CAVAZZUTI P. & RAPUZZI I., 1996 - Descrizione di dodici nuovi taxa del genere *Carabus* L. originari della Cina e della Corea del Nord. Nota su *C. (Pseudocoptolabrus) taliensis firmatus* Cav. (1997), con proposta della sua elevazione al rango specifico. (Coleoptera, Carabidae) - *Lambillionea*, Tervuren, 105 (2): 203-220.
- CAVAZZUTI P. & RATTI P., 1999 - Note sui *Carabus* della Cina. Nuove specie e sottospecie di *Apotomopterus* Hope, *Isiocarabus* Reitter e *Archaeocarabus* Semenow (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 5 (6): 93-114.
- DEUVE T., 1989 - Nouveaux Carabidae des collections de l'Institut Zoologique de l'Academia Sinica de Pékin (Coleoptera) - *Nouv. Rev. Ent.*, (N.S.), Paris, 6 (2): 159-171.
- DEUVE T., 1990 - Description d'un nouveau *Carabus* du Sichuan (Col. Carabidae) - *Bull. Soc. ent. France*, Paris, 95 (5-6): 160.
- DEUVE T., 1991a - Nouveaux *Cychrus* et *Carabus* d'Asie - *Bull. Soc. Sciences Nat*, Compiègne, 70: 17-21.
- DEUVE T., 1991b - Descriptions de deux Cychrini de la province chinoise du Sichuan (Col., Carabidae) - *Bull. Soc. Sciences Nat*, Compiègne, 72: 19-20.
- DEUVE T., 1992 - Contribution à l'inventaire des Carabidae de Chine (Coleoptera) (19^e note).- *Bull. Soc. ent. France*, Paris, 96 (3) (1991): 223-242.
- DEUVE T., 1993 - *Carabus Cychropsis* et *Cychrus* nouveaux des provinces de la Chine occidentale (Col., Carabidae) - *L'Entomologiste*, Paris, 48 (6) (1992): 317-322.
- DEUVE T., 1994 - Contribution à l'inventaire des genres *Carabus* et *Cychrus* en Chine (Coleoptera, Carabidae) - *Bull. Soc. Sciences Nat*, Compiègne, 82: 23-34.
- DEUVE T., 1997 - Nouveaux *Carabus* et *Cychrus* du Sichuan et du Yunnan, Chine (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 3 (1): 1-11.
- DEUVE T., 2001a - Note sur l'identité de *Carabus (Lamprostus) cylindricior* et descriptions de nouveaux *Carabus* d'Iran (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 7 (11): 147-163.
- DEUVE T., 2001b - Nouveaux *Carabus* L. et *Cychrus* F. et *Cychropsis* Boileau asiatiques et note sur les *Megodontus* Solier d'Iran (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 7 (7): 85-102.
- DEUVE T., 2005 - Trois nouveaux *Carabus* du Sichuan (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 11 (1): 1-7.
- DEUVE T. & OHSHIMA S. I., 1990 - Un nouveau *Coptolabrus* de Chine (Coleoptera, Carabidae) - *Bull. Soc. Sciences Nat*, Compiègne, 63: 8-9.
- DEUVE T. & TIAN M.T., 2007 - Nouveaux *Carabus* L. et *Cychrus* F. du Qinghai oriental et du Sichuan septentrional (Coleoptera, Carabidae) - *Coléoptères*, Guyancourt, 13 (2): 25-34.

- FAIRMAIRE L., 1893 - [Communication à la Séance du 12 avril 1893] - *Annales Soc. ent. France*, Paris, 62, *Bull. ent.*: clxxv-clxxvi.
- HAUSER G., 1922 - Beitrag zur Carabenfauna Ostasiens - *Arch. Naturg.*, Berlin, Abt. A, 88 (7): 103-109.
- HEINZ W., 2002 - Beschreibung einer neuen *Carabus* (*Lamprostus*)-Art aus Persien (Coleoptera, Carabidae) - *Zool. Middle East*, Heidelberg, 26: 151-156.
- IMURA Y., 1996 - Contribution to the knowledge of Carabid fauna (Coleoptera, Carabidae) in Western Hubei and Southwestern Anhui China - *Gekkan-Mushi*, Tokyo, 299: 10-14.
- IMURA Y., 1999 - Ten new taxa of the genera *Carabus* and *Cychrus* (Coleoptera, Carabidae) from China - *Japan. Journ. syst. Ent.*, Tokyo, 5 (1): 135-144.
- KLEINFELD F., 2000 - Drei neue *Carabus*-Arten aus den Provinzen Sichuan und Yunnan, China (Coleoptera: Carabidae: Carabini) - *Ent. Zeitschr.*, Stuttgart, 110 (3): 66-70.
- ROESCHKE H., 1898 - Carabologische Notizen I - *Ent. Nachr.*, Putbus, 24: 121-126.

RIASSUNTO

Sono descritti e illustrati alcuni nuovi taxa dei generi *Carabus* L. e *Cychrus* F. provenienti dalla Cina centro-occidentale, e dall'Iran nord-occidentale: *Carabus* (*Apotomopterus*) *mecynodes mitis* n. ssp.; *C. (A.) patroclus xinshibanus* n. ssp.; *C. (Archaeocarabus) lacertosus* n. sp.; *C. (Rhigocarabus) impavidus* n. sp.; *C. (Cupreocarabus) laevithorax arduus* n. ssp.; *C. (C.) lixianensis pseudomorettoii* n. ssp.; *C. (Lamprostus) seroulikbin* n. sp.; *C. (Coptolabrus) ishizukai hubeianus* n. ssp.; *Cychrus toledanoi* n. sp.; *C. toledanoi maerkangensis* n. ssp. e *C. bruggei lianghensis* n. ssp.

Viene infine proposto il nome nuovo: *tianzhuiensis* per *C. (Piocarabus) vladimirskyi tianzhuicus* Cavazzuti, 2006, preoccupato da *C. (Isiocarabus) kiukiangensis tianzhuicus* Imura, 1996.

RÉSUMÉ

Nouveaux *Carabus* L. et *Cychrus* F. de Chine et Iran. Descriptions et notes systématiques (Coleoptera, Carabidae).

Sont décrites et illustrée quelques nouveaux taxa des genres *Carabus* L. et *Cychrus* F., originaires de la Chine centre-occidentale, et du nord-ouest Iran: *Carabus* (*Apotomopterus*) *mecynodes mitis* n. ssp.; *C. (A.) patroclus xinshibanus* n. ssp.; *C. (Archaeocarabus) lacertosus* n. sp.; *C. (Rhigocarabus) impavidus* n. sp.; *C. (Cupreocarabus) laevithorax arduus* n. ssp.; *C. (C.) lixianensis pseudomorettoii* n. ssp.; *C. (Lamprostus) seroulikbin* n. sp.; *C. (Coptolabrus) ishizukai hubeianus* n. ssp.; *Cychrus toledanoi* n. sp.; *C. toledanoi maerkangensis* n. ssp. et *C. bruggei lianghensis* n. ssp.

Il est enfin proposé le nouveau nom: *tianzhuiensis* pour *C. (Piocarabus) vladimirskyi tianzhuicus* Cavazzuti, 2006, préoccupé par *C. (Isiocarabus) kiukiangensis tianzhuicus* Imura, 1996.

ABSTRACT

New *Carabus* L. and *Cychrus* F. from China and Iran. Description and systematic notes (Coleoptera, Carabidae).

The Author describes and represents some news taxa of the genus *Carabus* L. and *Cychrus* F. coming from middle-western of China, and from North-western Iran: *Carabus* (*Apotomopterus*) *mecynodes mitis* n. ssp.; *C. (A.) patroclus xinshibanus* n. ssp.; *C. (Archaeocarabus) lacertosus* n. sp.; *C. (Rhigocarabus) impavidus* n. sp.; *C. (Cupreocarabus) laevithorax arduus* n. ssp.; *C. (C.) lixianensis pseudomoretto* n. ssp.; *C. (Lamprostus) seroulikbin* n. sp.; *C. (Coptolabrus) ishizukai hubeianus* n. ssp.; *Cychrus toledanoi* n. sp.; *C. toledanoi maerkangensis* n. ssp. and *C. bruggei lianghensis* n. ssp.

The new name *tianzhuiensis* is proposed for *C. (Piocarabus) vladimirskyi tianzhuicus* Cavazzuti, 2006, preoccupied by *C. (Isiocarabus) kiukiangensis tianzhuicus* Imura, 1996.

PIERO LEO*

OSSERVAZIONI SU *DICHILLUS CORSICUS* E
DESCRIZIONE DI TRE NUOVE SPECIE DEL
MEDITERRANEO OCCIDENTALE

(COLEOPTERA, TENEBRIONIDAE)

INTRODUZIONE

La sistematica e la nomenclatura delle specie mediterranee del genere *Dichillus* Jacquelin du Val, 1861 risultano ancor oggi problematiche. L'ultimo lavoro che tratta contemporaneamente tutte le specie del genere risale ormai a più di novanta anni fa (REITTER 1916) e purtroppo, data la scarsa utilità diagnostica di alcuni dei caratteri utilizzati, unitamente alla notevole variabilità morfologica intraspecifica di certe specie e ad alcuni problemi nomenclatoriali mai definitivamente risolti, non consente una sicura identificazione di parte dei taxa noti.

Dichillus corsicus (Solier, 1838) è stato oggetto negli ultimi anni di alcuni lavori, le cui conclusioni risultano discordanti. ARDOIN (1973), basandosi sull'esame di materiale tipico, ipotizza la sinonimia di *Dichillus pumilus* (Solier, 1838) con *D. corsicus*; ritiene però che gli esemplari di Sardegna da lui esaminati possano appartenere ad una specie nuova che indica provvisoriamente come "*Dichillus* (s. str.) *corsicus* (Solier) subsp. *pumilus* (Solier)". GARDINI (1976) osserva giustamente che "le specie di *Dichillus* del gruppo *corsicus-pumilus-subcostatus* sono particolarmente bisognose di revisione"; inoltre cita *D. pumilus*, precisando che si tratta del taxon interpretato nel senso di REITTER (1916), per alcune isole dell'Arcipelago Toscano, per la Corsica e per la Sardegna, fornendone una breve descrizione e il disegno dell'organo copulatore maschile. Quasi contemporaneamente,

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CANZONERI (1977) cita di Calabria alcuni esemplari come “*Dichillus* sp.? prope *corsicus* Sol.”, a suo parere morfologicamente intermedi tra due “forme” (“a” e “b”) presenti in Corsardinia, che descrive brevemente attribuendo loro rispettivamente i nomi di “*corsicus* Sol. (= *pumilus* Sol.)” e “*pumilus* di Baudi (nec Solier)”.

Successivamente questa interpretazione viene seguita da BONNEAU (1988), GARDINI (1995) e SOLDATI & SOLDATI (1998). Questi ultimi però, solo pochi anni più tardi (SOLDATI & SOLDATI 2002), affermano che in Corsica e Sardegna è presente solo *D. corsicus*; elencano i caratteri che avrebbero indotto gli autori precedenti (BAUDI 1874, PORTA 1934, ARDOIN 1973, GARDINI 1976 e CANZONERI 1977) a differenziare *corsicus* e *pumilus* (sensu Auctorum) (in realtà aggregano, con una interpretazione personale e qualche errore di traduzione, i diversi caratteri discriminanti indicati dai singoli autori citati) e ne contestano la validità, sostenendo che “en réalité, il existe deux formes extrêmes, et toute une gamme d’intermédiaires. Cette variabilité existe entre les différentes populations mais parfois aussi au sein même d’une population”; infine, sull’esame del materiale tipico di Solier, ripropongono la sinonimia tra *corsicus* e *pumilus*.

Nel presente lavoro, sulla base di un cospicuo materiale (circa 5.300 exx., provenienti da oltre 180 località, in gran parte della Sardegna ma anche di altre regioni italiane e della Corsica) e sull’esame di nuovi caratteri diagnostici e di altri già utilizzati da alcuni autori precedenti, riesamino *D. corsicus* (Solier, 1838) e *D. pumilus* (sensu REITTER 1916, nec SOLIER 1838), descrivendo quest’ultimo come nuova specie, essendo il nome *pumilus* preoccupato dalla specie di Solier. Con l’occasione descrivo altre due specie inedite recentemente scoperte, rispettivamente, in Sardegna e nelle Baleari.

A b b r e v i a z i o n i. MSNG: Museo Civico di Storia Naturale “G. Doria” di Genova; MSNM: Museo Civico di Storia Naturale di Milano; MZUR: Museo di Zoologia dell’Università degli Studi di Roma “La Sapienza”; CA: Coll. V. Aliquò, Palermo; CF: Coll. L. Fancello, Cagliari; CFA: Coll. S. Fattorini, Roma; CG: Coll. G. Gardini, Genova; CL: Coll. P. Leo, Cagliari; CLI: Coll. A. Liberto, Roma; CM: Coll. C. Meloni, Cagliari; CMO: Coll. A. Molinu, Sassari; CS: Coll. D. Sechi, Quartu Sant’Elena (Cagliari); CSO: Coll. F. Soldati, Montpellier.

Dichillus (Dichillus) corsicus (Solier, 1838) (figg. 1, 3, 5, 7, 9)

Tagenia corsica Solier, 1838: 33, loc. typ.: Corsica

Dichillus (Dichillus) corsicus: REITTER 1916: 159; PORTA 1934: 112

Dichillus corsicus: SOLDATI & SOLDATI 2002: 167 (pars)

= *Tagenia pumila* Solier, 1838: 33, loc. typ.: Sardegna

Descrizione. Lunghezza totale 2,70-3,78 mm. Corpo e antenne generalmente di colore bruno scuro, zampe rossicce; gli esemplari più o meno immaturi possono essere uniformemente bruno rossicci o anche bicolori: capo e pronoto bruno rossicci ed elitre bruno scure. Tegumenti lucidi.

Capo un po' più lungo che largo (rapporto lunghezza/larghezza: 1,1-1,2), con una fitta e robusta punteggiatura ben impressa sulla



Fig. 1 - Habitus del ♂ di *Dichillus corsicus* (Corsica, Serra di Pigno) (foto A. Liberto).

fronte e sul vertice, più rada e più sottile sul clipeo. Guance poco dilatate in avanti, tempie debolmente convergenti in addietro, bruscamente ristrette all'altezza del collo. Cresta sopraoculare debole.

Antenne con lunghe e fitte setole giallastre; 1° antennumero un po' più lungo che largo, 2°-10° trasversi, 11° subquadrato; 2° antennumero più breve del 3°; 3° circa 1,2 volte più largo che lungo.

Pronoto piuttosto variabile nella forma, sempre più stretto del capo, un po' più lungo che largo (rapporto lunghezza/larghezza: 1,1-1,2), con la massima larghezza nella metà anteriore. Lati del pronoto brevemente ristretti in avanti e più lungamente in addietro, talvolta debolmente arrotondati, raramente sinuati avanti alla base. Angoli anteriori ottusi, non sporgenti in avanti; angoli posteriori debolmente ottusi, raramente quasi retti; ribordo laterale indistinto,



Fig. 2 - Habitus del ♂ di *Dichillus tyrrhenicus* n. sp. (Sardegna, Marrubiu: paratypus) (foto A. Liberto).

talvolta appena accennato nel quarto anteriore. Punteggiatura robusta e abbastanza fitta, dello stesso diametro di quella della fronte. Pleure protoraciche con punti fitti, simili per diametro a quelli del pronoto; prosterno e metasterno con punteggiatura molto robusta e leggermente diradata.

Elitre convesse, oblunghe, snelle, più di due volte più lunghe che larghe (rapporto lunghezza/larghezza: 2,05-2,25), con la massima larghezza poco dietro la metà, attenuate in punta all'apice. Scultura elitrale molto variabile: ciascun'elitra porta otto serie longitudinali di punti ben impressi, più o meno robusti, più o meno ravvicinati tra loro; nella gran parte delle popolazioni gli intervalli terzo, quinto e settimo sono più elevati dei rimanenti: il terzo e il quinto almeno nel tratto basale, il settimo, per lo più careniforme, per gran parte della sua lunghezza; in alcune popolazioni di Corsica e Sardegna tutti gli intervalli sono quasi piani, o solo il settimo è appena più elevato nella metà basale. Intervalli elitrali con una serie un po' irregolare di micropunti, visibili a forte ingrandimento. Orlo laterale delle elitre ben rilevato, subcareniforme; epipleure ben delimitate dalla base all'apice elitrale, prive di serie regolare di punti.

Sterniti addominali punteggiati; i punti sono più robusti sul primo sternite visibile (con un diametro leggermente minore di quelli del metasterno), più piccoli e fitti sul quarto e quinto. Nei ♂♂ i primi due urosterniti sono leggermente spianati nella zona centrale.

Zampe (figg. 3, 5, 7) snelle; femori leggermente clavati e sinuosi, tibie subrette e relativamente lunghe (il rapporto lunghezza/larghezza è di 4,5 nelle tibie anteriori e mediane, di 5,5 nelle posteriori), tarsi molto allungati, unghie lunghe e robuste. Nei ♂♂ tutte le tibie presentano, al lato interno, una serie di piccoli tubercoletti e un dentino aguzzo apicale, quasi perpendicolare all'asse longitudinale delle tibie stesse.

Organo copulatore maschile (fig. 9) relativamente slanciato, con il tegmen lungo come la capsula paramerica; questa è 3,9 volte più lunga che larga, con apice piuttosto attenuato all'apice.

M a t e r i a l e e s a m i n a t o e d i s t r i b u - z i o n e . *Dichillus corsicus* è presente in Corsica, Sardegna e Italia meridionale (Campania, Basilicata, Calabria) (cfr. fig. 11). Personalmente ho esaminato circa 3.200 esemplari provenienti dalle seguenti località:

Corsica: Serra di Pigno, Bastia, Saint Florent, L'Ile-Rousse, Ponte Leccia (Haute-Corse); Bocognano, Ajaccio, Col de Bavella, Tassinca, Sartene-foce Ortole (Corse-du-Sud).

Sardegna: Chiaramonti, Cargeghe, Alà dei Sardi, Ardara, Alghero-Torre Porticciolo, Bultei, Padria, Semestene (prov. Sassari); Onanì, M. Tuttavista, Marina di Orosei, Dorgali, Badde Sali-ghes, Sindia, Macomer, Silanus, Baunei, Urzulei, Supramonte di Orgosolo, M. Novo San Giovanni, Arcu Correboi, Villanova Strisaili, Arzana, Sorgono, Desulo, Aritzo, Bruncu Spina, M. Spada, Laconi, Nuragus, Isili, M. Tonneri, Gairo Taquisara, Sarule (prov. Nuoro); Cuglieri, Arborea, M. Arci, Sini, Gonnostramatza, Masullas (prov. Oristano); Flumentorgiu, Giara di Gesturi, Tuili, Turri, Ussaramanna, Siddi, Las Plassas, Sardara, Pabillonis, Guspini, M. Arcuentu, Arbus-Montevicchio, Arbus-Costa Verde, M. Linas, Suelli, Fluminimaggiore-Tempio di Antas, Buggerru, Iglesias, Gonnena, Domusnovas-Sa Duchessa, Furtei, Senorbì, Serrenti, Pimentel, Villagrecia, Nuraminis, Serramanna, Soleminis, M. Sette Fratelli, Decimomannu, Uta, M. Arcosu, Assemini, Elmas, Cagliari, Perdaxius, Santadi, Domusdemaria, Isola S. Antioco (prov. Cagliari).

Campania: S. Maria di Castellabate, Laurino, Cilento-M. Sacro (prov. Salerno).

Basilicata: Senise, M. Pollino (prov. Potenza).

Calabria: Orsomarso-fiume Argentino, Lungro, Bocchigliero-Bosco Basilicò, S. Pietro in Guarano (prov. Cosenza); Cotronei (prov. Crotone); Passo del Mercante, Passo di Pietraspada (prov. Reggio Calabria).

Sono sicuramente da attribuirsi a *D. corsicus* le citazioni di *D. subcostatus* (Solier, 1838) per la Calabria (REITTER 1916) e di *Dichillus* sp. per la Campania (Ascea Marina, Scavi di Velia e Vallo Lucano, Laurito: GARDINI 1976) e la Calabria (Montalto: CANZONERI 1977); anche la segnalazione di *D. minutus* (Solier, 1838) per Senise (Potenza) (LEO 1985) è in realtà da riferire a *D. corsicus*. Restano dubbie le località citate da SOLDATI & SOLDATI (2002), poiché appare evidente che i due autori francesi associano sotto *D. corsicus* anche *D. tyrrhenicus* n. sp., descritto nel presente lavoro. E' di dubbia interpretazione, ma probabilmente errata, la segnalazione di *D. corsicus* per l'Abruzzo (ANDRETTI *et al.* 1997), mentre sono certamente da riferire a *D. tyrrhenicus* n. sp. le citazioni (sempre

sotto *D. corsicus*) di MARCUZZI (1985) per l'Isola d'Elba e di LO CASCIO (2001) per l'Arcipelago Toscano (da notare però che la foto riprodotta in quest'ultimo lavoro rappresenta realmente un esemplare di *D. corsicus*, evidentemente di altra provenienza).

Osservazioni. Come altre specie congeneri, *D. corsicus* è morfologicamente piuttosto variabile, soprattutto per quanto riguarda dimensioni e scultura elitrale. Anche se le singole popolazioni si presentano generalmente stabili morfologicamente, la variabilità non sembra grandemente influenzata da fattori geografici: in Sardegna e in Corsica gli esemplari di popolazioni limitrofe possono presentare una facies più o meno differente, ma del tutto coincidente con esemplari di provenienza geografica anche molto lontana. Nell'Italia meridionale la variabilità sembra essere minore, tuttavia la morfologia degli esemplari appartenenti a tali popolazioni non è affatto dissimile da quella riscontrabile in numerose stazioni sardo-corse. Nel complesso, ritengo senz'altro che la specie non possa essere suddivisibile in razze geografiche.

Per quanto riguarda la sinonimia con *Tagenia pumila* Solier, 1838, pur non avendo potuto esaminare materiale tipico, ritengo che non sussistano dubbi in proposito; questa sinonimia, già ipotizzata da ARDOIN (1973) sull'esame dei tipi di Solier, è stata ufficializzata da CANZONERI (1977) e ribadita nei lavori di BONNEAU (1988), GARDINI (1995) e SOLDATI & SOLDATI (1998). Successivamente, SOLDATI & SOLDATI (2002), ristudiando il materiale tipico, confermano ancora la sinonimia suddetta; va osservato però che i due autori non considerano *D. tyrrhenicus* n. sp., descritto nel presente lavoro, un taxon ben differenziato da *D. corsicus*; in ogni caso è sufficiente leggere le descrizioni di SOLIER (1838: 33-34) per appurare che la sua *Tagenia pumila* non può corrispondere a *Dichillus tyrrhenicus* n. sp.: "Nigra vel rufo-obscura, angustior ovalis..." e ancora "Roussastre ou obscure et presque noire, très-étroite..." "Antennes...couvertes de très petits poils d'un jaunâtre un peu doré qui les font paraître de cette couleur". Dall'esame comparativo delle descrizioni originali di *Tagenia corsica* e *T. pumila*, considerando anche la variabilità morfologica cui si è accennato, non emergono inoltre caratteri morfologici tali da poter considerare distinti i due taxa.

Dichillus corsicus sembra essere affine soprattutto a *D. subcostatus* (Solier, 1838), della Penisola Iberica e del Marocco settentrionale; quest'ultimo si differenzia però abbastanza agevolmente da

D. corsicus per le dimensioni (minime, medie e massime) maggiori (3-4,5 mm), per il pronoto più allungato (rapporto lunghezza/larghezza: 1,2-1,35) e con gli angoli anteriori leggermente protratti in avanti, per il ribordo laterale dello stesso pronoto nettamente più marcato e per il terzo antennumero non trasverso. Più numerose e più nette appaiono le differenze con *D. tyrrhenicus* n. sp., per le quali si rimanda alla discussione di quest'ultima specie.

Note ecologiche. *Dichillus corsicus* è presente in vari ambienti, dal livello del mare a circa 1800 m di quota. Sembra preferire la macchia mediterranea degradata, i pascoli incolti e le fasce di separazione tra i coltivi, mentre rifugge le zone fittamente forestate e gli ambienti costieri più xerici. Presente tutto l'anno, si rinviene più facilmente dall'autunno alla primavera, in genere sotto i sassi o vagliando il terriccio alla base di vari arbusti, taora nei nidi di formiche; nei terreni pianeggianti sottoposti a periodici allagamenti è talvolta possibile osservarne un gran numero di esemplari rifugiati sotto corteccia di *Eucalyptus*.

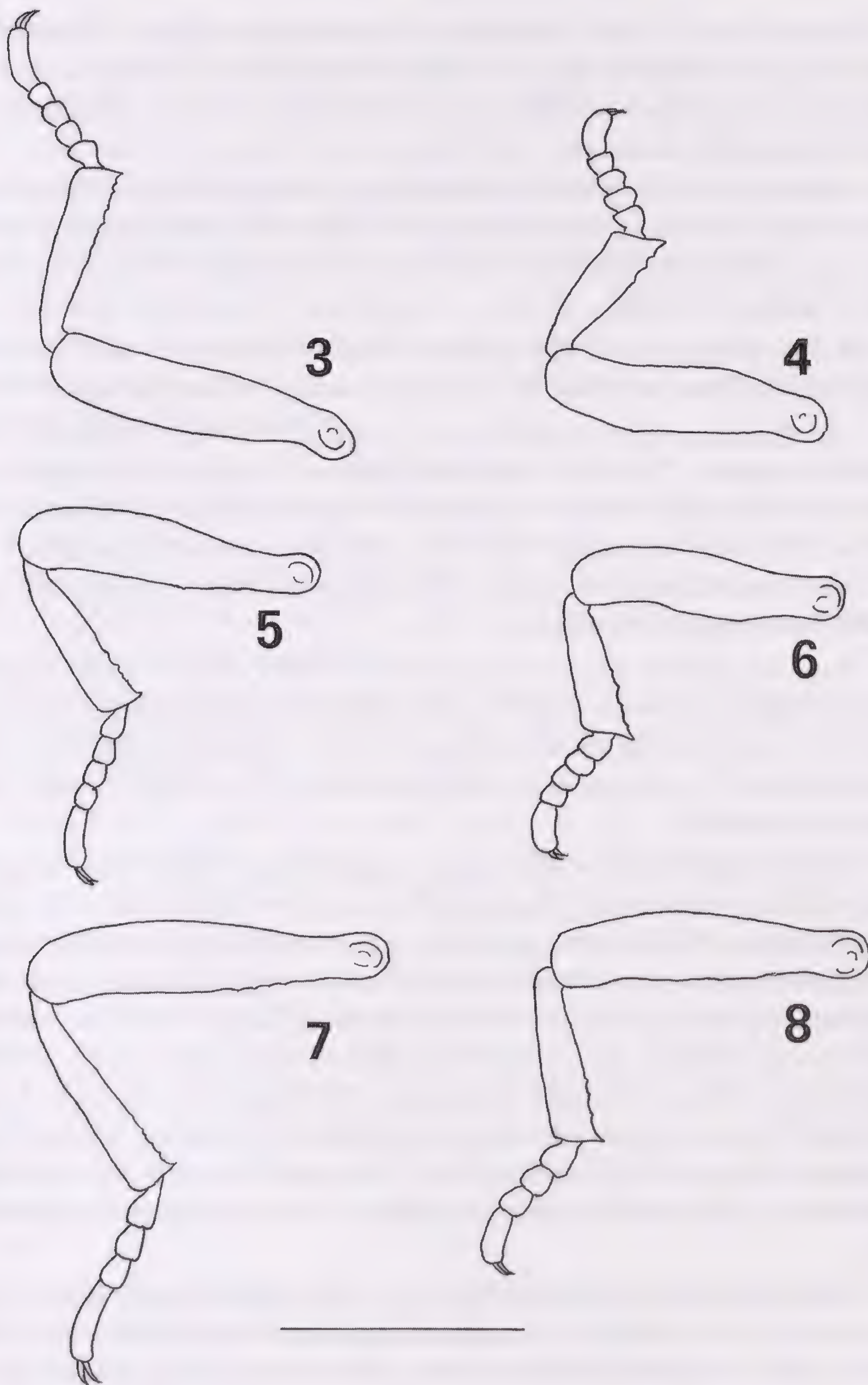
***Dichillus (Dichillus) tyrrhenicus* n. sp.** (figg. 2, 4, 6, 8, 10)

Dichillus (Dichillus) pumilus: BAUDI 1874: 297; REITTER 1916: 159; PORTA 1934: 112; GARDINI 1976 : 651; CANZONERI 1977: 261; BONNEAU 1988: 134 (nec *Tagenia pumila* Solier, 1838)

Dichillus (Dichillus) corsicus ssp. *pumilus*: ARDOIN 1973: 258 (nec *Tagenia pumila* Solier, 1838)

Dichillus corsicus: SOLDATI & SOLDATI 2002: 167 (pars)

Diagnosi. Un *Dichillus* s. str. di medie dimensioni, subopaco, con corpo, zampe e antenne di colore uniformemente bruno rossiccio. Punteggiatura dorsale robusta. Pronoto all'incirca così lungo che largo, non ribordato ai lati. Elitre con la massima larghezza dietro la metà, arrotondate all'apice, con otto strie di robusti punti ben impressi, intervalli elitrali subpiani; ribordo elitrale indistinto, epipleure delimitate da un intervallo marginale appena convesso, non careniforme. Antenne robuste, con antennumeri 2°-10° fortemente trasversi; setole delle antenne molto corte e rade, poco visibili nei tre antennumeri basali. Tibie corte, nel maschio con robusto dente apicale al lato interno; tarsi brevi, pretarsi piuttosto tozzi. Organo copulatore maschile relativamente corto e robusto.



Figg. 3-8 - Profilo schematico delle zampe sinistre anteriori (3 e 4), mediane (5 e 6) e posteriori (7 e 8) dei ♂♂ di *Dichillus corsicus* (3, 5, 7) e *D. tyrrhenicus* n. sp. (4, 6, 8). Scala 0,5 mm.

Serie tipica. Holotypus ♂: Sardegna (prov. Oristano), Marrubiu, 21.III.2005, leg. P. Leo. Paratypi ♂♂ e ♀♀ (stessa località dell'holotypus): 25.XI.1979, leg. C. Meloni, 39 exx.; 21.III.2005, leg. P. Leo, 266 exx.

Holotypus e 10 paratypi depositati presso il Museo Civico di Storia Naturale "G. Doria" di Genova (MSNG); altri paratypi nelle seguenti collezioni: MSNM, MZUR, CA, CF, CFA, CG, CL, CLI, CM, CMO, CS, CSO.

Descrizione. Lunghezza totale 2,70-3,52 mm. Corpo subopaco, interamente bruno rossiccio, zampe e antenne concolori.

Capo subquadrato o appena più lungo che largo (rapporto lunghezza/larghezza: 1,0-1,1), con una robusta e densa punteggiatura, ben impressa sulla fronte e sul vertice, più rada e superficiale sul clipeo. Guance piuttosto dilatate, tempie appena convergenti in addietro, bruscamente ristrette all'altezza del collo. Cresta sopraoculare debolmente ingrossata.

Antenne grosse con setole giallastre molto corte e rade, soprattutto sui primi tre articoli che spesso appaiono quasi glabri; 1° antennumero un po' più lungo che largo, 2°-10° nettamente trasversi, 11° subquadrato; 2° antennumero più breve del 3°; 3° 1,4-1,5 volte più largo che lungo;

Pronoto più stretto del capo, appena più lungo che largo o subquadrato (rapporto lunghezza/larghezza: 1,0-1,1), con la massima larghezza nella metà anteriore. Lati del pronoto arrotondati, brevemente ristretti in avanti e più o meno lungamente in addietro, talvolta leggermente sinuati avanti alla base; angoli anteriori ottusi, non sporgenti in avanti; angoli posteriori un poco ottusi, a volte quasi retti; ribordo laterale indistinto. Punteggiatura dorsale densa e robusta, dello stesso diametro di quella della fronte. Pleure protoraciche con punti fitti, simili per diametro a quelli del pronoto; prosterno e metasterno con punteggiatura ancora più robusta, diradata.

Elitre ovali, poco convesse, spesso un po' appiattite sul disco, relativamente poco allungate (rapporto lunghezza/larghezza: 1,85-2,10), con la massima larghezza nettamente dietro la metà, piuttosto arrotondate all'apice. Scultura elitrale variabile: ciascun'elitra porta otto serie longitudinali di punti ben impressi e robusti, più o meno ravvicinati tra loro; i punti delle strie, più robusti e marcati sulle strie

più interne e nella metà basale, tendono a ridursi come diametro e profondità sulle strie esterne e nella zona apicale dell'elitra; intervalli elitrali quasi piani, talvolta il terzo, quinto e settimo sono un po' più convessi nella zona basale dell'elitra; intervalli elitrali con radi micropunti, visibili solo a forte ingrandimento. L'orlo laterale delle elitre è debolmente rilevato, non careniforme, e delimita appena le epipleure; epipleure elitrali prive di serie regolare di punti.

Sterniti addominali punteggiati; i punti sono più robusti e radi sul primo e secondo sternite visibile, più fini e densi sul terzo, quarto e quinto. Nei ♂♂ i primi due urosterniti sono nettamente spianati nella zona centrale.

Zampe (figg. 4, 6, 8) con femori debolmente clavati e sinuosi, tibie subrette e molto tozze (il rapporto lunghezza/larghezza è di 3,6 nelle tibie anteriori e mediane, di 4,0 nelle posteriori), tarsi corti, unghie piccole. Nei ♂♂ tutte le tibie presentano, al lato interno, una serie di piccoli tubercoletti e un dente apicale relativamente robusto e un poco pendente distalmente.

Organo copulatore maschile (fig. 10) relativamente tozzo, con il tegmen appena più corto della capsula paramerica; questa è 3,4 volte più lunga che larga, con apice robusto.

M a t e r i a l e e s a m i n a t o e d i s t r i b u - z i o n e . *Dichillus tyrrhenicus* n. sp. è diffuso in Sardegna (comprese numerose isole circumsarde), in Corsica, in alcune isole dell'Arcipelago Toscano e sul promontorio dell'Argentario (Toscana) (cfr. fig. 12). Sono senz'altro da riferire alla nuova specie le segnalazioni di ARDOIN (1973) per la Sardegna (Cussedu presso Tempio Pausania, Abbasanta e Domusnovas, sub *D. corsicus* ssp. *pumilus*) e di GARDINI (1976) per l'Arcipelago Toscano (Isola d'Elba, Giglio, Capraia e Montecristo, sub *D. pumilus*); anche le citazioni di MARCUZZI (1985) per l'Isola d'Elba e di LO CASCIO (2001) per l'Arcipelago Toscano (entrambe sub *D. corsicus*) vanno riferite a *D. tyrrhenicus* n. sp.

Personalmente, oltre alla serie tipica, ho potuto esaminare circa 1.800 esemplari, provenienti dalle seguenti località:

Corsica: Cervione, Vaccaja, Aleria (Haute-Corse); Porto-Vecchio, Tonnara Plage, Bonifacio (Corse-du-Sud).

Sardegna: Isola Razzoli, Isola Spargiotto, Isola delle Bisce, Isola Soffi, Arzachena, Badesi, Isola Asinara, Stintino, Golfo Aranci,

Olbia, Chiaramonti, Osilo, Sassari, Cargeghe, Alà dei Sardi, Chilivani, Capo Caccia, Alghero, Torralba, Giave, Bonorva, Padria, Seme-stene, Burgos (prov. Sassari); Loculi, Onanì, M. Tuttavista, Marina di Orosei, Monte Albo, Lula, Campeda, Bosa, Magomadas, Sindia, Dorgali, Oniferi, Silanus, Macomer, Birori, Dualchi, Borore, Orani, Ottana, Mamoiada, Baunei, M. Novo San Giovanni, Arcu Correb-oi, Villanova Strisaili, Arzana, Sorgono, Aritzo, Ortuabis, Laconi, M. Tonneri, Seui, Esterzili, Isili, Orroli, Tertenia (prov. Nuoro); Sedilo, Abbasanta, Paulilatino, S. Caterina di Pittinuri, Riola Sardo, Isola Mal di Ventre, Cabras, Stagno di Mistras, Oristano, San Gio-vanni di Sinis, Asuni, M. Arci, Arborea, Uras, Mogoro, San Nicolò Arcidano (prov. Oristano); Flumentorgiu, Giara di Gesturi, Col-linas, Sardara, Pabillonis, Guspini, Arbus, Arbus-Montevercchio, Arbus-Costa Verde, Gonnosfanadiga, M. Linas, Villacidro, Flu-minimaggiore, Buggerru, Nebida, Iglesias, Gonnese, Domusnovas, Senorbì, San Nicolò Gerrei, Quirra, Villasalto, Serrenti, Villagrec-a, Villaputzu, Siliqua, Uta, Burcei, M. Sette Fratelli, Elmas, Stagno Simbirizzi, S. Isidoro, Cagliari, Carbonia, Capoterra, Capitana, Cala Regina, Santadi, Perdaxius, Villasimius, Isola Serpentara, Isola dei Cavoli, Sarroch, Pula, Isola San Pietro, Isola S. Antioco, Isola Vacca, S. Anna Arresi, Domusdemaria, Porto Teulada (prov. Cagliari).

Toscana: Isola Capraia, Isola d'Elba (prov. Livorno); Monte Argentario (prov. Grosseto).

Osservazioni e note comparative. *Dichillus tyrrhenicus* n. sp. corrisponde sicuramente a *D. pumilus* sensu BAUDI (1874) e REITTER (1916); quest'ultimo Autore indica, in contrappo-sizione con *D. corsicus*, caratteri differenziali nella colorazione, nella conformazione del margine elitrale e nella chetotassi delle antenne; anche *D. pumilus* citato e brevemente descritto da GARDINI (1976) (che specifica chiaramente "...l'entità che chiamo *Dichillus pumilus* nel senso di Reitter...") è da riferire senza dubbio alla nuova specie qui descritta.

D. tyrrhenicus n. sp. non può invece essere identificato con la *Tage-nia pumila* Solier, 1838 la cui descrizione originale è in contrasto con la morfologia della nuova specie qui descritta: su quest'ultimo punto e sulla sinonimia tra *D. pumilus* (Solier, 1838) e *D. corsicus* (Solier, 1838) si vedano le osservazioni a proposito di quest'ultima specie.

Nonostante la confusione cui ha dato luogo in passato, *D. tyrrhe-*

nicus n. sp. appare ben differenziato dalle congeneri; l'unica specie con cui si possa confrontare è *D. corsicus*, rispetto alla quale, però, presenta numerosi e costanti caratteri differenziali: la nuova specie presenta costantemente i tegumenti dorsali più opachi (soprattutto capo e pronoto), l'apice elitale più arrotondato, l'orlo laterale delle elitre non carenato, le antenne molto meno pubescenti (soprattutto i primi articoli) con il terzo antennumero più trasverso, tutte le tibie e i tarsi nettamente più tozzi (cfr. figg. 3-8), l'organo copulatore maschile più corto e diversamente conformato (cfr. figg. 9-10); inoltre in *D. corsicus* le dimensioni massime sono maggiori e, nella media degli esemplari, il colore è più scuro e capo, pronoto ed elitre sono più slanciati.

Dichillus tyrrhenicus n. sp. e *D. corsicus* convivono strettamente

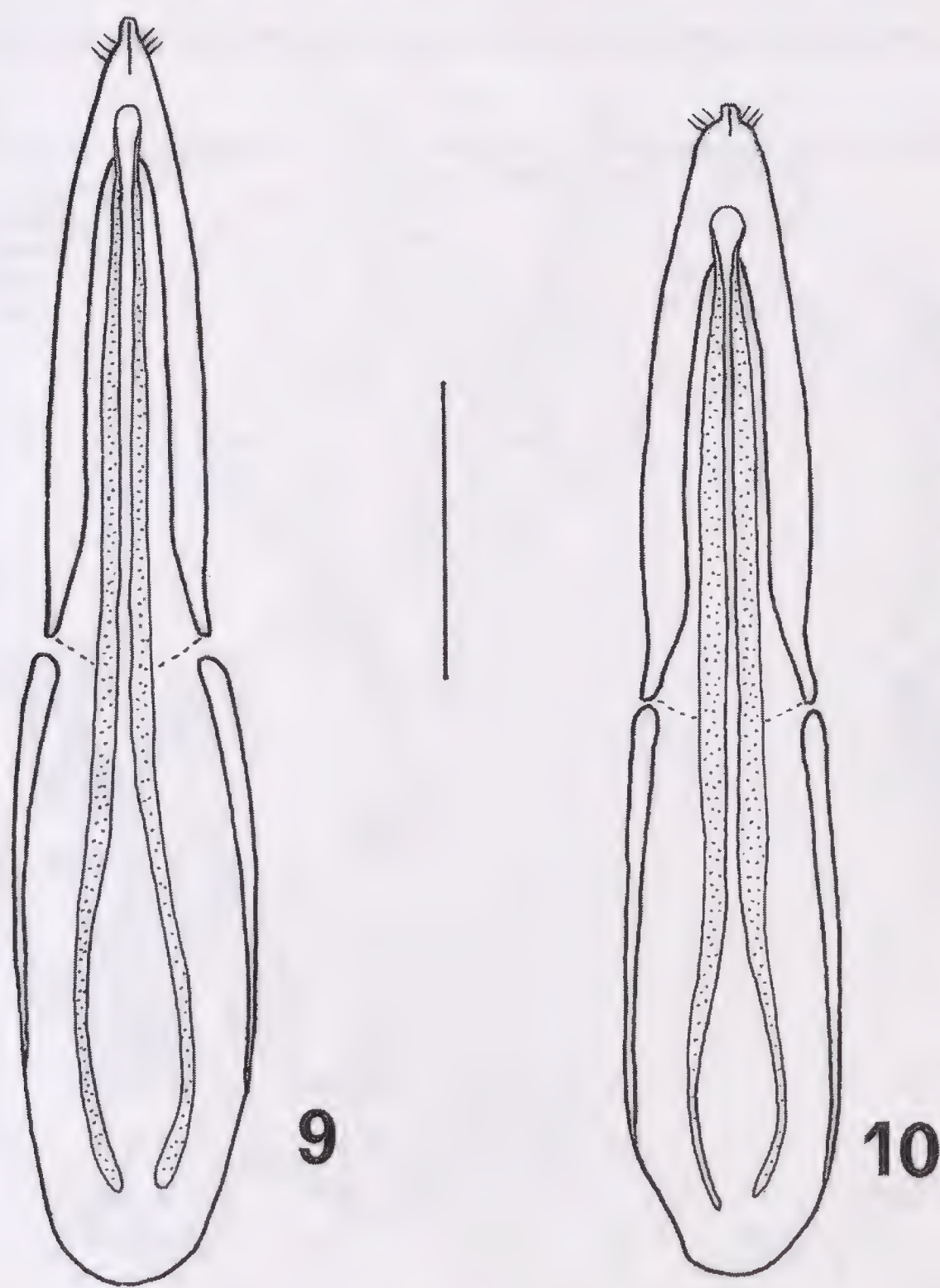


Fig. 9 - Organo copulatore maschile, in visione ventrale, di *Dichillus corsicus* (Corsica, Serra di Pigno); fig. 10: idem di *D. tyrrhenicus* n. sp. (Sardegna, Marubiu: paratypus). Scala 0,2 mm.

in numerose località della Sardegna; in alcune occasioni mi è capitato anche di raccogliere esemplari delle due specie insieme sotto lo stesso sasso, seppure aggregati in gruppetti monospecifici distinti. Tuttavia, benché abbia esaminato più di cinquemila individui delle due specie, non ho mai incontrato esemplari che potessero far pensare ad ibridi interspecifici; evidentemente la distanza genetica tra le due specie è tale da non permettere, nonostante la stretta sintopia, fenomeni di ibridazione. L'affermazione di SOLDATI & SOLDATI (2002), secondo i quali "...il existe deux formes extrêmes, et toute une gamme d'intermédiaires", è dovuta evidentemente ad una errata interpretazione dei caratteri differenziali.

Note ecologiche. *Dichillus tyrrhenicus* n. sp. colonizza vari ambienti, dal livello del mare fino ad almeno 1300 m di quota. Manifesta una netta preferenza per gli ambienti xerici con suoli com-

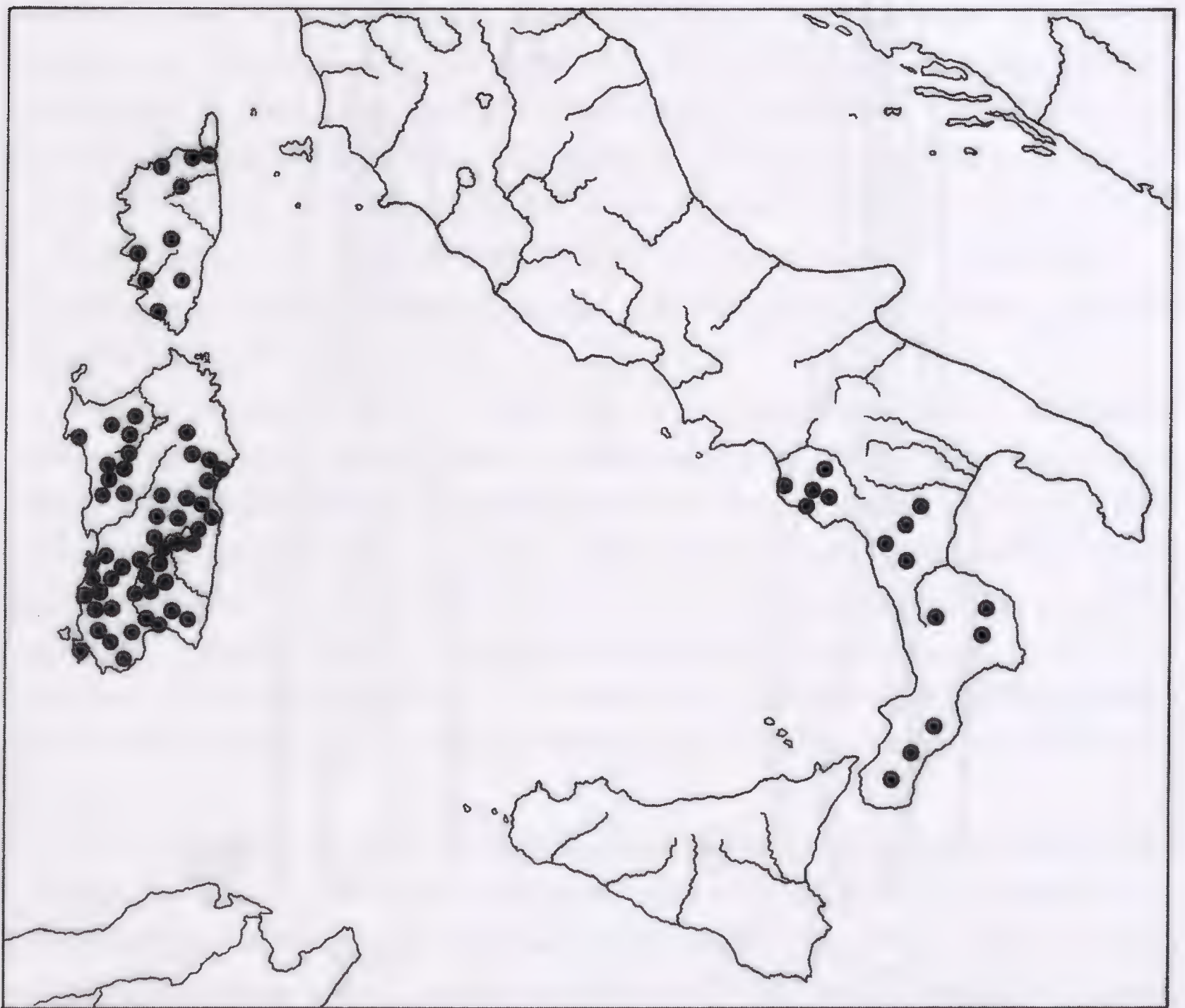


Fig. 11 - Distribuzione geografica di *Dichillus corsicus* (località limitrofe sono segnate sotto lo stesso simbolo).

patti e affioramenti rocciosi ed è frequente nelle garighe costiere e di media montagna, nelle zone a macchia mediterranea più degradata e nelle aree sottoposte a pascolo intensivo e ad incendi periodici. Presente tutto l'anno, è molto più frequente in autunno-inverno ed è rinvenibile, spesso in serie numerose di esemplari, sotto i sassi o vagliando il terriccio alla base dei pulvini, talvolta associato a varie specie di formiche.

Derivatio nominis. Il nome della nuova specie deriva dalla sua distribuzione geografica.

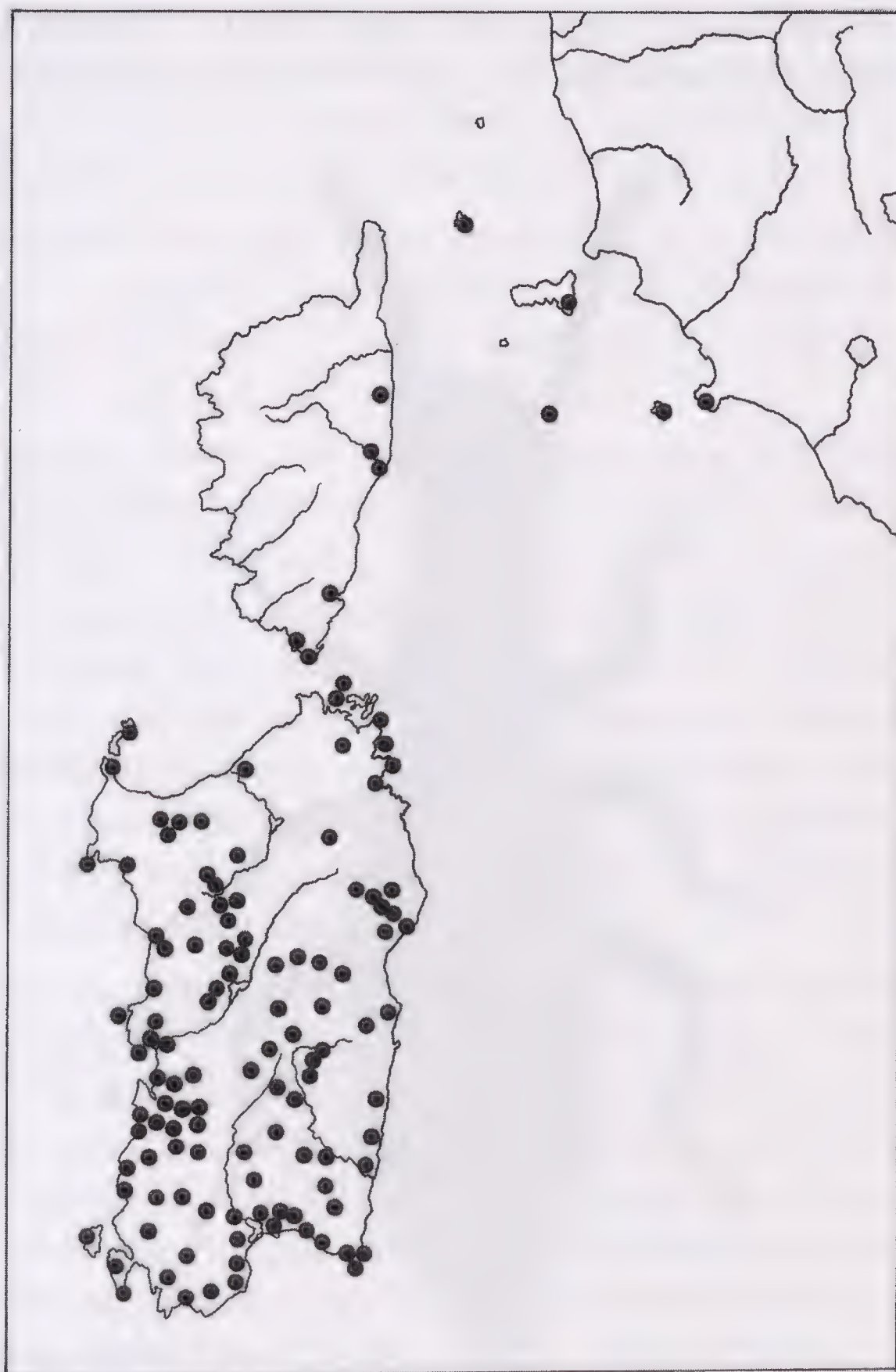


Fig. 12 - Distribuzione geografica di *Dichillus tyrrhenicus* n. sp. (località limitrofe sono segnate sotto lo stesso simbolo).

***Dichillus (Dichillus) tapinomae* n. sp.** (figg. 13, 15)

D i a g n o s i. Un *Dichillus* s. str. di medie dimensioni, con tegumenti molto opachi, corpo di colore bruno scuro, zampe e antenne bruno rossicce. Punteggiatura dorsale poco robusta. Pronoto subcilindrico, più lungo che largo, non ribordato ai lati. Elitre slanciate, con otto serie di punti relativamente piccoli e ravvicinati; settimo intervallo elitrare molto convesso, subcarenato; ribordo elitrare distinto, epipleure ben delimitate. Antenne sottili, con setole corte ma fitte, ben visibili. Tibie e tarsi slanciati. Dimorfismo sessuale secondario attenuato.

Serie tipica. Holotypus ♂: Sardegna (prov. Oristano), San Giovanni di Sinis, 7.IV.1995, leg. P. Leo. Paratypi ♂♂ e ♀♀ (stessa località dell'holotypus): 5.X.1979, leg. C. Meloni 1 ex.;



Fig. 13 - Habitus del ♂ di *Dichillus tapinomae* n. sp. (Sardegna, San Giovanni di Sinis: paratypus) (foto A. Liberto).

10.VII.1980, leg. L. Fancello 1 ex.; 17.IV.1993, leg. P. Leo 1 ex.; 7.IV.1995, leg. P. Leo 18 ex.; 22.III.1997, leg. P. Leo 1 ex.; 14.X.1998, leg. D. Sechi 34 exx.; 19.III.2007, leg. P. Leo 9 ex.

Holotypus e due paratypi depositati presso il Museo Civico di Storia Naturale "G. Doria" di Genova (MSNG); altri paratypi nelle seguenti collezioni: CG, CL, CLI, CM, CS, CSO.

D e s c r i z i o n e . Lunghezza totale 3,0-3,83 mm. Tegumenti estremamente opachi, alutacei, bruno scuri, zampe e antenne bruno rossicce.

Capo più lungo che largo (rapporto lunghezza/larghezza: 1,10-1,15), con punteggiatura mediocrementemente robusta, fitta e ben impressa sulla fronte e sul vertice, più rada e superficiale sul clipeo. Guance poco dilatate in avanti, tempie debolmente convergenti in addietro, cresta sopraoculare debolmente ingrossata.

Antenne con setole giallastre piuttosto corte ma abbastanza fitte, ben visibili su tutti gli antennumeri. Primo articolo antennale un po' più lungo che largo; 2° e 3° subeguali, 1,1 volte più larghi che lunghi; 4°-10° trasversi, 11° subquadrato.

Pronoto più stretto del capo, subcilindrico, più lungo che largo (rapporto lunghezza/larghezza: 1,15-1,2), con la massima larghezza intorno alla metà. Lati del pronoto assai poco arrotondati, appena ristretti in avanti e in addietro, non sinuati avanti alla base; angoli anteriori e posteriori ottusi; ribordo laterale indistinto, appena accennato nel quarto anteriore. Punteggiatura dorsale mediocrementemente robusta, dello stesso diametro di quella della fronte, piuttosto fitta. Pleure protoraciche con punti simili per diametro a quelli del pronoto, ma più radi; prosterno e metasterno con punteggiatura un poco più robusta, diradata;

Elitre poco convesse, oblunghe, snelle, più di due volte più lunghe che larghe (rapporto lunghezza/larghezza: 2,12-2,22), poco arrotondate ai lati, con la massima larghezza appena dietro la metà, attenuate in punta all'apice. Elitre con otto serie longitudinali di punti relativamente piccoli ma ben impressi, soprattutto sulle strie interne e nella metà basale dell'elitra, piuttosto ravvicinati tra loro; intervalli elitrali subpiani, ad eccezione del settimo che è molto convesso e quasi careniforme, e del terzo e quinto che sono un po' convessi nella metà basale dell'elitra; intervalli elitrali con microscultura molto forte, quasi granulosa. Orlo laterale delle elitre ben rilevato,

subcareniforme; epipleure ben delimitate dalla base all'apice elitrale, prive di serie ben definite di punti ma con una scultura granulosa e plissettata e qualche confuso punto irregolare.

Sterniti addominali mediocrementemente punteggiati; i punti sono più robusti sul primo e secondo sternite visibile (con un diametro simile a quelli del metasterno), più fitti sul quarto e quinto. Nei ♂♂ i primi due urosterniti sono appena spianati nella zona centrale.

Zampe snelle; femori leggermente clavati e sinuosi, tibie subrette e relativamente lunghe (il rapporto lunghezza/larghezza è di 4,5 nelle tibie anteriori e mediane, di 5,5 nelle posteriori), tarsi molto allungati, unghie lunghe e robuste. Nei ♂♂ tutte le tibie presentano, al lato interno, una serie di minuscoli tubercoletti, appena apprezzabili a forte ingrandimento, e un piccolissimo dentino aguzzo apicale, quasi perpendicolare all'asse longitudinale delle tibie stesse.

Organo copulatore maschile (fig. 15) poco sclerificato, con il tegmen un po' più corto della capsula paramerica; questa è 3,8 volte più lunga che larga, subparallela, bruscamente attenuata all'apice; pezzo mediano relativamente breve.

Osservazioni e note comparative. *Dichillus tapinomae* n. sp. sembra essere un endemita della Sardegna ed è attualmente noto di un'unica località costiera della penisola del Sinis (Sardegna occidentale).

La nuova specie appare nettamente differenziata da tutte le congeneri per i caratteri elencati nella diagnosi; in particolare i tegumenti estremamente opachi ed alutacei la distinguono a colpo d'occhio da tutte le specie occidentali del sottogenere *Dichillus*; rispetto a *D. corsicus* e *D. tyrrhenicus* n. sp., le altre specie presenti in Sardegna, presenta inoltre una punteggiatura dorsale e sternale più minuta, il pronoto più cilindrico, i caratteri sessuali secondari delle tibie e degli sterniti addominali attenuati, l'organo copulatore maschile diversamente conformato (cfr. figg. 9, 10, 15); da *D. tyrrhenicus* n. sp. si differenzia ulteriormente per la colorazione più scura, la conformazione più slanciata di capo, pronoto ed elitre, il margine elitrale ben delimitato, gli articoli antennali meno trasversi e più villosi, le tibie più strette e i tarsi più allungati.

Note ecologiche. *Dichillus tapinomae* n. sp. è stato raccolto nelle dune e nel retroduna sabbioso della spiaggia di San Giovanni di Sinis, esclusivamente nei nidi della formica *Tapinoma*

simrothi Krausse, 1909 (det. M. Mei), specie della sottofamiglia Dolichoderinae ampiamente distribuita nella parte meridionale del bacino mediterraneo. Vari tentativi di raccolta effettuati vagliando la sabbia all'esterno dei formicai sono sempre risultati infruttuosi.

Derivatio nominis. La nuova specie prende il nome dalla formica ospite.

***Dichillus (Dichillus) maioricensis* n. sp.** (figg. 14, 16)

Diagnosi. Un *Dichillus* s. str. di dimensioni medio-grandi, con tegumenti lucidi di colore bruno. Punteggiatura dorsale robusta. Pronoto più lungo che largo, ribordato ai lati. Elitre appiattite sul disco, slanciate, acuminate all'apice; strie elitrali formate da punti molto robusti; terzo, quinto e settimo intervallo molto elevati, careniformi. Epipleure elitrali con una distinta serie di punti. Antenne robuste con lunghe e fittissime setole. Tibie e tarsi slanciati. Organo copulatore maschile molto slanciato, con capsula paramerica lunga e stretta.

Serie tipica. Holotypus ♂: Isole Baleari, Mallorca, Sierra de Torrellas, 20.IV.1993, leg. H. Pierotti. Paratypi: stessa località dell'holotypus, 20.IV.1993, leg. H. Pierotti 1 ♂ e 1 ♀; Mallorca, Lluçmajor, Son Sunyer, 24.IV.2000, leg. C. Bellò 1 ♂ e 2 ♀♀; Mallorca, Palma, Son Muntaner, 24.IV.2000, leg. C. Bellò 1 ♀.

Holotypus depositato presso il Museo Civico di Storia Naturale "G. Doria" di Genova (MSNG); paratypi: 2 ♂♂ e 2 ♀♀ (CL), 1 ♀ (CLI), 1 ♀ (CM).

Descrizione. Lunghezza totale 3,12-4,25 mm. Corpo, antenne e zampe di colore rosso bruno, talvolta le elitre più scure. Tegumenti lucidi.

Capo più lungo che largo (rapporto lunghezza/larghezza: 1,17-1,22) con punteggiatura fitta e robusta sulla fronte e sul vertice, più rada e più sottile sul clipeo. Guance poco dilatate in avanti, tempie debolmente convergenti in addietro, bruscamente ristrette all'altezza del collo; cresta sopraoculare ben tracciata.

Antenne robuste con setole giallastre lunghe ed estremamente fitte, compatte; 1° antennumero allungato, 2° un po' trasverso, distintamente più piccolo del 3° che è all'incirca così lungo che largo; antennumeri dal 4° al 10° trasversi, 11° subquadrato.

Pronoto più stretto del capo, subcilindrico, circa 1,2 volte più lungo che largo, con la massima larghezza intorno alla metà o appena spostata in avanti. Lati del pronoto poco arrotondati; angoli anteriori con vertice leggermente protratto in avanti; ribordo laterale sottile ma distinto e completo. Punteggiatura del pronoto robusta e abbastanza fitta, i punti di un diametro un poco maggiore di quelli della fronte. Pleure protoraciche e prosterno con punteggiatura più robusta e meno fitta di quella del pronoto; metasterno con punti ancora più grossi e radi.

Elitre molto appiattite sul disco, oblunghe, più di due volte più lunghe che larghe (rapporto lunghezza/larghezza: 2,10-2,23), con la massima larghezza appena dietro la metà, attenuate in punta



Fig. 14 - Habitus del ♂ di *Dichillus maioricensis* n. sp. (Baleari, Is. Maiorca, Sierra de Torrellas: paratypus) (foto A. Liberto).

all'apice. Elitre con otto serie longitudinali di punti, molto grossi e ben impressi; terzo, quinto e settimo intervallo elitrare fortemente elevati, e costiformi dalla base al declivio apicale. Orlo laterale delle elitre rilevato, subcareniforme; epipleure delimitate dalla base all'apice elitrare, con una serie longitudinale di punti, più piccoli di quelli delle serie dorsali ma ben distinti.

Sterniti addominali punteggiati; i punti sono più robusti e radi sul primo e secondo sternite visibile, progressivamente più fini e densi sul terzo, quarto e quinto. Nei ♂♂ i primi due urosterniti sono appena spianati nella zona centrale.

Zampe snelle; femori leggermente clavati, tibie appena sinuose e relativamente lunghe (il rapporto lunghezza/larghezza è di 4,5 nelle tibie anteriori e mediane, di 5,5 nelle posteriori), tarsi allungati, unghie lunghe e robuste. Nei ♂♂ tutte le tibie presentano, al lato interno, una serie di piccoli tubercoletti e un dentino aguzzo apicale, quasi perpendicolare all'asse longitudinale delle tibie stesse.

Organo copulatore maschile (fig. 16) molto slanciato, con capsula paramerica appena più lunga del tegmen, 4,5 volte più lunga che larga, subparallela, bruscamente attenuata all'apice.

O s s e r v a z i o n i e n o t e c o m p a r a t i v e . *Dichillus maioricensis* n. sp. sembra essere un raro endemita dell'isola di Maiorca ed è la sola specie del sottogenere nominale presente nell'Arcipelago delle Baleari. *Dichillus* (*Dichillinus*) *laeviusculus* Kraatz, 1862, specie iberico-magrebina citata di Maiorca, Ibiza e Formentera (ESPAÑOL 1954, ESPAÑOL & COMAS 1981), si distingue a colpo d'occhio dalla nuova specie per numerosi caratteri (dimensioni minori, aspetto d'insieme molto tozzo, punteggiatura dorsale finissima, pronoto ed elitre privi di orlo laterale, intervalli elitrari piani, antenne molto più grosse e con setole cortissime e rade, ecc.). Per vari caratteri, quali dimensioni, forma generale, pronoto distintamente orlato ai lati e con gli angoli anteriori un poco protratti in avanti e terzo antennumero non trasverso, *D. maioricensis* n. sp. mostra evidenti affinità con *D. subcostatus* (Solier, 1838), specie ampiamente diffusa nella Penisola Iberica e nel nord del Marocco, morfologicamente molto variabile e di cui andrebbe approfondita la sistematica a livello subspecifico. Infatti, nonostante le sinonimie proposte da VIÑOLAS & CARTAGENA 2005, è probabile che le diverse "varietà" descritte per questa entità vadano almeno elevate al rango di razza geografica (cfr. anche ESPAÑOL 1947, 1956).

La nuova specie si differenzia però nettamente da qualsiasi forma di *D. subcostatus* sensu lato per i seguenti caratteri: setole delle antenne molto più fitte, soprattutto sugli articoli 2°-5°; disco elitrare più appiattito; terzo, quinto e settimo intervallo elitrare molto elevati (molto più che in *D. subcostatus* "var." *elevatus* Reitter, 1886), careniformi dalla base al declivio apicale; epipleure elitrari con una distinta serie di punti; organo copulatore maschile molto più slanciato, con capsula paramerica molto lunga e stretta (cfr. h. o.: fig. 16, ESPAÑOL 1947: fig. 2 e VIÑOLAS & CARTAGENA 2005: fig. 133).

Note ecologiche. *Dichillus maioricensis* n. sp. è stato raccolto al vaglio nella macchia mediterranea.

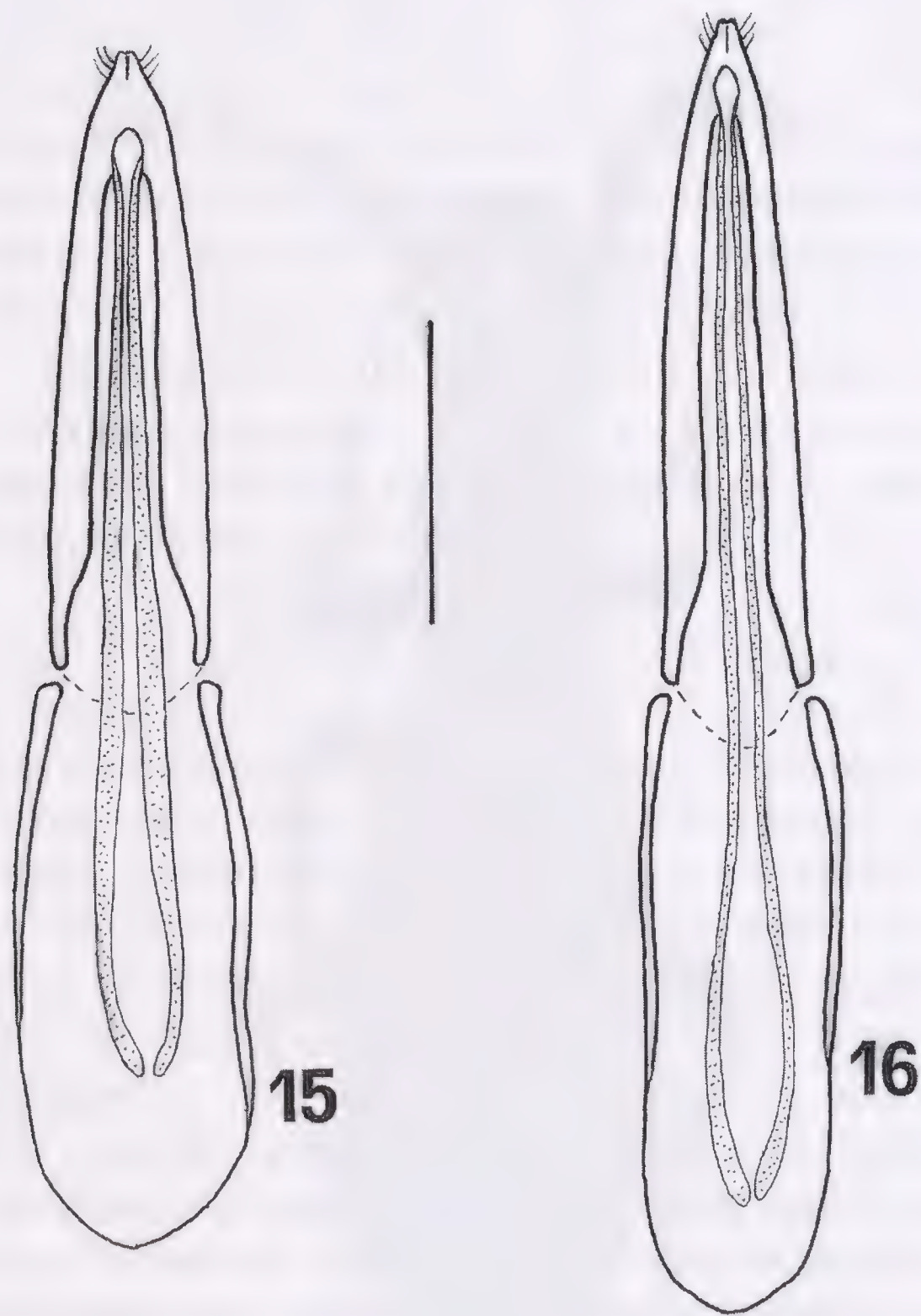


Fig. 15 - Organo copulatore maschile, in visione ventrale, di *Dichillus tapinomae* n. sp. (Sardegna, San Giovanni di Sinis: paratypus); fig. 16: idem di *D. maioricensis* n. sp. (Baleari, Is. Maiorca, Sierra de Torrellas: holotypus). Scala 0,2 mm.

Derivatio nominis. Dal latino *Maiorica*-ae, antico nome dell'isola di Maiorca.

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BIBLIOGRAFIA

- ANDREETTI A., DI GAETANO B., DI MARCO C., OSELLA G. & RITI M., 1997 - 23. Coleoptera Tenebrionidae (Insecta) (pp. 425-443) - In: Osella G., Biondi M., Di Marco C. & Riti M. - Ricerche sulla Valle Peligna (Italia centrale, Abruzzo). *Quaderni di Provincia oggi*, L'Aquila, 23 (2): 419-814.
- ARDOIN P., 1973 - Contribution a l'étude des Tenebrionidae (Coleoptera) de Sardaigne - *Annales Soc. ent. Fr.*, (n. s.), Paris, 9 (2): 257-307.
- BAUDI F., 1874 - Coleotteri Tenebrioniti delle collezioni italiane. Parte prima - *Bull. Soc. ent. ital.*, Firenze, 6: 183-200, 275-301.
- BONNEAU P., 1988 - Contribution à la rédaction d'un catalogue des Tenebrionidae (Coleoptera) de France. Première partie - *L'Entomologiste*, Paris, 44 (3): 133-145.
- CANZONERI S., 1977 - Contributo alla conoscenza dei Tenebrionidi appenninici (XXXI Contributo allo studio dei Tenebrionidi) - *Boll. Mus. civ. St. nat. Verona*, 4: 227-285.
- ESPAÑOL F., 1947 - Algunos Stenosinae y Opatrinae recogidos durante una breve campaña entomologica por la provincia de Castellon (Col. Tenebrionidae) - *Eos*, Madrid, 23 (3): 185-200.

- ESPAÑOL F., 1954 - Los Tenebrionidos (Col.) de Baleares - *Trab. Mus. Cien. nat. Barcelona*, (n. s., Zool.), 1 (5): 1-96.
- ESPAÑOL F., 1956 - Contribución al estudio de los tenebrionidos del noroeste de España (Col. Heteromeros) - *Publ. Inst. Biol. apl.*, Barcelona, 24: 5-71.
- ESPAÑOL F. & COMAS J., 1981 - Sobre algunos Tenebrionidos (Col.) del Mediterraneo occidental - *Eos*, Madrid, 57: 91-96.
- GARDINI G., 1976 - Materiali per lo studio dei Tenebrionidi dell'Arcipelago Toscano (Col. Heteromera) - *Lavori Soc. ital. Biogeogr.*, (n.s.), Forlì, 5 (1974): 637-723.
- GARDINI G., 1995 - Coleoptera Polyphaga XIII (Lagriidae, Alleculidae, Tenebrionidae), 17 pp. - In: Minelli A., Ruffo S. & La Posta S. (eds.). Checklist delle specie della fauna italiana, 58, Calderini, Bologna.
- LEO P., 1985 - Segnalazioni faunistiche italiane. 54. *Dichillus* (s. str.) *minutus* (Solier) - *Boll. Soc. ent. ital.*, Genova, 117 (1-3): 64.
- LO CASCIO P., 2001 - Tenebrionidae (pp. 219-228) - In: A. Sforzi & L. Bartolozzi (eds). Libro Rosso degli insetti della Toscana. Arsia, Firenze, 376 pp.
- MARCUZZI G., 1985 - I Tenebrionidi (Coleoptera Heteromera) conservati presso il Museo di Scienze Naturali di Bergamo - *Rivista Mus. Sc. nat. Bergamo*, 9: 117-125
- PORTA A., 1934 - Fauna Coleopterorum Italica, 4. Heteromera-Phytophaga - Stab. Tip. Piacentino, Piacenza, 415 pp.
- REITTER E., 1916 - Bestimmungs-Tabellen der palaearktischer Coleopteren. 79. Heft. Tenebrionidae Zopherini, Elenophorini, Leptodini, Stenosini und Lachnogyini aus der paläarktischen Fauna - *Wien. ent. Zeit.*, Wien, 35 (5-7): 129-171.
- SOLDATI F. & SOLDATI L., 1998 - Liste systématique remise à jour des Coléoptères Tenebrionidae de la faune de France - *Bull. Soc. linn. Bordeaux*, 26 (4): 141-154.
- SOLDATI F. & SOLDATI L., 2002 - Les *Dichillus* corso-sardes: taxonomie et géonémie (Coleoptera, Tenebrionidae, Stenosini) - *Bull. Soc. ent. Fr.*, Paris, 107 (2): 165-168.
- SOLIER A., 1838 - Essai d'une division des Coléoptères et d'une monographie de la famille des Collaptérides. Deuxième division: les Phanéroglosses - *Annales Soc. ent. Fr.*, Paris, 7: 5-73.
- VIÑOLAS A. & CARTAGENA M. C., 2005 - Fauna de Tenebrionidae de la Península Ibérica y Baleares. Vol. I. Lagriinae y Pimeliinae - Argania Editio, Barcelona, 428 pp.

RIASSUNTO

Vengono discussi i problemi nomenclatoriali riguardanti *Dichillus* (*Dichillus*) *corsicus* (Solier, 1838) (= *pumilus* Solier, 1838) che viene ridescritto. Vengono inoltre descritte tre nuove specie: *Dichillus* (*Dichillus*) *tyrrhenicus* n. sp. (Sardegna, Corsica e Toscana), in passato citato da vari Autori come *pumilus* (nec Solier), *D. (D.) tapinomae* n. sp. (Sardegna) e *D. (D.) maioricensis* n. sp. (Baleari, Maiorca).

ABSTRACT

Remarks on *Dichillus corsicus* and description of three new species from West Mediterranean (Coleoptera Tenebrionidae).

The nomenclatural problems concerning *Dichillus* (*Dichillus*) *corsicus* (Solier, 1838) (= *pumilus* Solier, 1838) are discussed, and a redescription of the species is given. Moreover three new species are described: *Dichillus* (*Dichillus*) *tyrrhenicus* n. sp. from Sardinia, Corsica and Tuscany, previously often quoted by many Authors as *pumilus* (nec Solier), *D. (D.) tapinomae* n. sp. from Sardinia, and *D. (D.) maioricensis* n. sp. from Majorca (Balearic Islands).

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PSEUDOSCORPIONES **

INTRODUZIONE

Le prime notizie relative a Pseudoscorpioni delle piccole isole circumsarde si trovano in due contributi di GESTRO (1904) e di ELLINGSEN (1909), i quali citano rispettivamente due specie per l'Isola di San Pietro e tre per l'Isola Asinara. Più recentemente CALLAINI (1983a, b) indica la presenza di sei specie sull'Isola di Sant'Antioco, quindi GRAFITTI & MUCEDDA (1996) e GRAFITTI *et al.* (1996) citano due specie cavernicole dell'Isola Tavolara. Lo stato delle conoscenze a tutt'oggi è quindi di 12 specie citate e di sole 4 isole esplorate.

Grazie alla cortesia del dott. Roberto Poggi, Direttore del Museo civico di Storia naturale "G. Doria" di Genova, ho potuto studiare circa 1.320 esemplari di Pseudoscorpioni, quasi tutti da lui raccolti su 44 isole circumsarde nel corso delle ricerche zoologiche della nave oceanografica "Minerva" del C. N. R. effettuate negli anni compresi tra il 1986 e il 1994.

Le 24 specie identificate (e le 3 non identificate) sono elencate secondo l'ordine sistematico seguito da GARDINI (2000); l'elenco dei reperti e delle isole segue il criterio geografico proposto da BACCETTI *et al.* (1989): da NE (Arcipelago de La Maddalena) in senso orario sino a NW (Is. Asinara).

Qualora non diversamente specificato, il materiale si intende raccolto da R. Poggi e depositato presso il Museo civico di Storia naturale "G. Doria".

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** Pseudoscorpioni d'Italia XLI.

ELENCO DELLE SPECIE

1) *Chthonius (Chthonius) ischnocheles* (Hermann, 1804)

BEIER 1963a: 25; GARDINI 2004: 126.

Is. La Maddalena, Case Fangotto, 4.VII.1990, 1 ♀; Is. Asinara, Cala Arena, 1.VII.1987, 2 ♂♂, 1 ♀.

Specie euro-anatolica-macaronesica nota di tutte le regioni d'Italia; euriecia e antropofila, nelle regioni centromeridionali e in Sardegna è particolarmente frequente nelle zone fotiche di cavità naturali e artificiali. Delle isole circumsarde era già citata di Sant'Antioco (CALLAINI 1983b).

2) *Chthonius (Chthonius) tenuis* L. Koch, 1873

BEIER 1963a: 31.

Is. Spargi, Cala Granara, 16.X.1989, 1 ♂; id., Valle di Cala Cannicchio, 13.XII.1993, vaglio *Arbutus unedo* L., 1 ♀; Is. La Maddalena, La Trinità, 9.IV.1986, C. Manicasteri e R. Argano leg., 2 ♂♂; Is. Caprera, Fonte Teialone, 7.IV.1986, sub *Quercus ilex* L., 1 ♀; Is. Santo Stefano, 12.XI.1986, 1 ♂; Is. delle Bische, 11.XI.1986, 1 T (**); Is. delle Rocche, 11.XI.1986, 1 ♂; Is. Sant'Antioco, Cala Lunga, 12.XII.1993, V. Cottarelli leg., 1 ♂; id., Sa Scrocca Manna, 12.XII.1993, 1 ♂.

Specie euro-maghrebina nota di tutte le regioni italiane. Diffusa, ma sporadica, in tutta la Sardegna, ma non ancora citata di alcuna isola circumsarda.

3) *Chthonius (Ephippiochthonius) berninii* Callaini, 1983

CALLAINI 1983a: 406.

Is. Serpentara, 9.V.1988, 1 ♀; Is. Il Toro, 10.V.1988, 1 ♀.

*** T = tritoninfa, D = deutoninfa, P = protoninfa.

Specie endemica della Sardegna meridionale. Delle isole circumsarde era già nota di Sant'Antioco (Callaini 1983a).

4) ***Chthonius (Ephippiochthonius) elbanus*** Beier, 1963

BEIER 1963b: 151; GARDINI 1993: 81.

Is. La Maddalena, Case Fangotto, 14.X.1989, 2 ♀♀; Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 1 ♀; Is. Tavolara, versante NW, 16.X.1989, 1 ♀; Is. Molara, 9.IV.1986, sub *Quercus ilex* L., 1 ♀.

Specie W-mediterranea a gravitazione tirrenica nota delle seguenti regioni italiane: Friuli-Venezia Giulia, Veneto, Emilia-Romagna, Lombardia, Piemonte, Liguria, Toscana e Arcipelago Toscano, Lazio, Sicilia e Sardegna centrosettentrionale (GARDINI 2000, 2004). Non citata sinora di isole circumsarde.

5) ***Chthonius (Ephippiochthonius)*** sp. prope ***elbanus*** Beier, 1963

Is. Li Nibani 1, 11.XI.1986, 1 ♀; Is. delle Rocche, 11.XI.1986, al vaglio, 1 ♂; Is. Soffi, 10.IV.1986, N. Baccetti leg., 1 ♂.

Popolazioni conspecifiche affini a *C. elbanus* per la presenza di un dente subterminale al dito mobile dei cheliceri, per la forma della mano dei palpi e per il modello di dentatura delle dita degli stessi: le dimensioni sono tuttavia nettamente minori (pinze dei palpi 0.46-0.48 mm). Lo stato tassonomico di queste popolazioni sarà formalizzato in una revisione delle specie italiane del subgen. *Ephippiochthonius* Beier, 1930.

6) ***Chthonius (Ephippiochthonius) gibbus*** Beier, 1953

GARDINI 1980: 268; 1993: 82.

Is. La Maddalena, Spiaggia dei Monti della Rena, 8.IX.1987, sub *Pistacia lentiscus* L., 1 ♀; Is. San Pietro, pendici Monte Guardia dei Mori, 10.VI.1989, 3 ♂♂; Is. Asinara, dintorni Tumbarino, 13.X.1989, 1 ♂.

Specie W-mediterraneo-macaronesica nota, per l'Italia, di Liguria, Calabria, Sicilia, Isole Eolie e Sardegna (GARDINI 2000). Non ancora citata di isole circumsarde.

7) ***Chthonius (Ephippiochthonius) tetrachelatus*** (Preyssler, 1790)

BEIER 1963a: 57.

Is. Molara, 13.IX.1987, sub *Salix* sp., 1 ♀; Is. Serpentara, 30.VII.1986, sub *Pistacia lentiscus* L., 2 ♂♂, 1 ♀; id., 7.VII.1990, 1 ♀; Is. San Pietro, Spiaggia Vinagra, 10.V.1988, V. Cottarelli leg., 1 ♀; id., Stagno Cala Vinagra, 13.V.1988, 1 ♀.

Specie ad ampia distribuzione euro-mediterranea-macaronesica, importata in U. S. A. e in Australia. Nota di quasi tutte le regioni italiane, isole maggiori comprese (GARDINI 2000). Non ancora citata di isole circumsarde.

8) ***Spelyngochthonius sardous*** Beier, 1955

GARDINI 1994: 6.

Is. Tavolara, Inghiottitoio della Mandria 189 Sa/SS, 90 m, 20.III.1994, M. Mucedda leg., 1 ♀; id., Grotta dei Trolls 2402 Sa/SS, 150 m, 19.IX.1998, A. Gillono leg., 1 T (tutti in coll. Gardini).

Specie troglobia già citata dell'Inghiottitoio della Mandria (GRAFITTI & MUCEDDA 1996, sub Pseudoscorpiones; GRAFITTI *et al.* 1996, sub *Spelyngochthonius* n. sp.), attribuita a *S. sardous* da GARDINI (in stampa).

9) ***Neobisium (Neobisium) incertum*** J. C. Chamberlin, 1930

BEIER 1963a: 97.

Is. Budelli, pendici Monte Budello, 14.XII.1993, 1 ♀; Is. Spargi, Cala Granara, 6.IX.1987, 2 TT; id., Cala Canniccio, 13.XII.1993, sotto *Pistacia lentiscus* L. in spiaggia, 1 ♂; id., Valle di Cala Cannic-

cio, 13.XII.1993, vaglio *Arbutus unedo* L., 2 ♂♂, 2 ♀♀; Is. La Maddalena, Case Fangotto, 14.X.1989, 4 TT; id., I Pozzoni, 14.X.1989, vaglio lentisco, 1 T; id., Case Fangotto, 4.VII.1990, 2 ♀♀; Is. Caprera, Stagnali, 7.IV.1986, sub *Myrtus communis* L., 1 ♀; id., Invaso Ferracciolo, 8.IX.1987, 2 TT; Isolotto Roma, 10.XI.1986, L. Tonon, 1 ♀; Is. delle Bische, 11.XI.1986, 1 ♂; Is. Li Nibani 1, 11.XI.1986, 2 TT; Is. Camere W, 11.IV.1986, 1 ♂, 1 ♀, 1 D; Is. Tavolara, 16.X.1989, 1 T; id., 9.XI.1986, 1 ♂, 2 ♀♀; Is. Molara, 10.XI.1986, al vaglio sub *Pistacia* sp., 2 ♂♂; id., 13.IX.1987, sub *Salix* sp., 2 TT; Is. Sant'Antioco, Cala Lunga, 12.VI.1989, 3 TT; id., Cussorgia, 12.VI.1989, 2 ♀♀; id., Stagno de Cirdu, 12.VI.1989, 1 T; id., Cala Lunga, 13.VI.1989, sotto lentisco, 1 ♀, 2 TT; id., Sa Scrocca Manna, 13.VI.1989, 1 ♀; Is. San Pietro, Stagno della Viva-gna, 10.V.1988, al vaglio, 1 ♀, 1 T; id., Canale del Geniale, dintorni Carloforte, 11.XII.1993, 2 ♂♂; Is. Asinara, Cala Arena, 12.X.1989, 3 ♂♂, 1 T; id., vaglio lentisco, 1 ♂, 1 ♀, 1 T; id., Monte Scomunica, 12.X.1989, lecceta, 3 TT, 1 D, 1 P; id., dintorni Tumbarino, 13.X.1989, 2 ♂♂, 3 ♀♀; id., sotto *Euphorbia dendroides* L., 1 ♂, 1 ♀; id., Cala Sombro di dentro, 13.X.1989, 1 ♀.

Specie endemica sarda citata sinora di due sole località: Asuni (non Sorgono: cfr. GARDINI 2000) e Monte Sette Fratelli.

10) *Roncus abditus* (J. C. Chamberlin, 1930)

GARDINI & RIZZERIO 1985: 66.

Is. Razzoli, 13.XI.1986, 2 ♂♂, 5 ♀♀; id., Cala della Noce, 10.VII.1990, 1 ♂; id., a S del Faro, 14.XII.1993, 1 ♂, 4 ♀♀; Is. Budelli, pendici Monte Budello, 14.XII.1993, 5 ♂♂, 8 ♀♀, 1 T; Is. La Presa, 16.X.1989, sotto lentisco, 1 ♀, 1 T; Isola Spargi, Cala Granara, 16.X.1989, 11 ♂♂, 6 ♀♀, 3 TT; id., Valle di Cala Cannic-cio, 13.XII.1993, vaglio *Arbutus unedo* L., 6 ♂♂, 7 ♀♀, 2 TT (3 ♂♂, 3 ♀♀ coll. Gardini); Isola La Maddalena, Spiaggia dei Monti della Rena, 8.IX.1987, sub *Pistacia lentiscus* L., 2 ♂♂, 2 ♀♀; id., Case Fangotto, 14.X.1989, 4 ♂♂, 3 ♀♀; id., Guardia Vecchia, 14.X.1989, 1 ♀; id., Cala Bassa Trinità, 14.X.1989, 1 ♂, 2 ♀♀; Is. Caprera, Fonte Teialone, 7.IV.1986, sub *Quercus ilex* L., 1 ♂, 1 ♀; id., Sta-gnali, 7.IV.1986, sub *Myrtus communis* L., 2 ♂♂, 3 ♀♀, 2 TT; id., 12.XI.1986, M. Bologna leg., 4 ♂♂, 1 ♀, 6 TT; id., 13.XI.1986, R.

Argano leg., 1 ♀; id., Forte Settentrionale, 15.X.1989, 1 ♂, 2 ♀♀; id., pendici Monte Teialone, 15.X.1989, lecceta, 11 ♂♂, 9 ♀♀, 2 TT; id., Forte Settentrionale, 5.VII.1990, sotto corbezzolo, 1 ♂, 2 ♀♀; Is. Santo Stefano, 12.XI.1986, 2 ♂♂; id., Forte San Giorgio, 17.VI.1989, sotto mirto, 1 ♂, 1 ♀; Isolotto Roma, 12.XI.1986, 1 ♀, 1 T; Is. delle Bisce, 11.XI.1986, 7 ♂♂, 1 ♀; Is. Li Nibani 1, 11.XI.1986, 10 ♂♂, 1 ♀, 2 TT, 1 D; Is. Li Nibani 3, 11.XI.1986, vaglio sub *Pistacia* sp., 4 ♂♂, 1 ♀; id. 3, 11.XI.1986, 1 ♂; Is. delle Rocche, 11.XI.1986, al vaglio, 2 ♂♂, 2 ♀♀; Is. Mortorio, 11.IV.1986, 1 D; id., 11.IV.1986, sub *Pistacia lentiscus* L., 2 ♂♂, 3 TT, 1 D; id., 3.VII.1987, 1 ♂; Is. Camere W, 11.IV.1986, 2 ♂♂; id., 11.IV.1986, al vaglio sub *Pistacia lentiscus* L., 1 ♂, 1 ♀; Is. Camere E, 11.IV.1986, al vaglio sub *Pistacia lentiscus* L., 1 ♀; Is. Soffi, 10.IV.1986, N. Baccetti leg., 1 ♂; Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 1 ♂; Is. Tavolara, 8.IV.1986, 3 ♂♂, 3 ♀♀ (coll. Gardini); id., 9.XI.1986, 23 ♂♂, 21 ♀♀ (5 ♂♂, 5 ♀♀ coll. Gardini); id., zona bassa dietro l'abitato, 9.XI.1986, M. Zapparoli leg., 1 ♂; id., versante NW, 16.X.1989, 3 TT; id., 16.X.1989, 1 ♂, 3 ♀♀; Is. Molaro, 9.IV.1986, sub *Acer* sp., 1 ♀; id., 10.XI.1986, al vaglio sub *Pistacia* sp., 10 ♂♂, 9 ♀♀; Is. Serpentara, 9.V.1988, 1 ♂; id., 7.VII.1990, 1 ♂, 1 T, 2 DD; Is. Asinara, Cala Arena, 12.X.1989, vaglio lentisco, 10 ♂♂, 9 ♀♀ (coll. Gardini); id., Monte Scomunica, 12.X.1989, lecceta, 10 ♂♂, 7 ♀♀, 4 TT; id., dintorni Tumbarino, 13.X.1989, 5 ♂♂, 6 ♀♀, 1 T; id., dintorni Tumbarino, 13.X.1989, sotto *Euphorbia dendroides* L., 1 ♂; id., Cala Sombro di dentro, 13.X.1989, 1 ♂, 1 ♀.

Specie citata dell'Italia centro-meridionale, Sicilia, Pantelleria, Corsica e Sardegna. È probabile che le popolazioni estranee al complesso corso-sardo debbano riferirsi ad altre specie (GARDINI 2000). La citazione di *Obisium lubricum* per l'Is. Asinara (ELLINGSEN 1909) è da riferirsi quasi certamente a *R. abditus*.

11) *Roncus caralitanus* Gardini, 1981

GARDINI 1981: 129.

Is. dei Cavoli, 30.VII.1986, 1 ♂; Is. Il Toro, 10.V.1988, 8 ♂♂, 3 ♀♀; Is. La Vacca, 10.V.1988, 1 ♀; Is. Sant'Antioco, Sa Scrocca Manna, 12.XII.1993, 3 ♂♂, 3 ♀♀, 2 TT; Is. San Pietro, Pendici

Monte Guardia dei Mori, 27.VI.1987, 1 ♀; id., NW de Le Colonne, 11.VI.1989, lentisco, 1 ♂, 1 ♀ (coll. Gardini); id., La Caletta, 11.XII.1993, sotto lentisco, 1 ♀; id., Canale del Geniale, dintorni Carloforte, 11.XII.1993, 5 ♂♂, 6 ♀♀, 9 TT; Is. dei Ratti, 13.V.1988, 1 ♀.

Specie endemica della Sardegna meridionale nota sinora con certezza solo della località tipica: Quartu Sant'Elena presso Cagliari (GARDINI 2000). La citazione di *Obisium lubricum* per l'Is. San Pietro: Carloforte (GESTRO 1904) è da riferirsi quasi certamente a *R. caralitanus*.

12) ***Roncus* sp. prope *turritanus*** Gardini, 1982

Is. Tavolara, Grotta dei Fiori d'Arancio 191 Sa/SS, 190 m, 27.VI.1993, G. Dore leg., 1 ♀, 1 T; id., 3.V.1998, J. De Waele leg., 1 ♂, 1 ♀; id., Grotta dei Trolls 2402 Sa/SS, 150 m, 19.IX.1998, A. Gillono leg., 1 ♂ (tutti in coll. Gardini)

Popolazioni cavernicole dell'Is. Tavolara, già citate della Grotta dei Fiori d'Arancio (GRAFITTI & MUCEDDA 1996; GRAFITTI *et al.* 1996, sub *Roncus* n. sp.), con stato tassonomico da definire nell'ambito del complesso riferito a *Roncus turritanus*, comprendente popolazioni ipogee delle aree carsiche di Sassari, Sedini, Ittiri e Mores, nella Sardegna nordoccidentale (GARDINI 2000).

13) ***Microcreagrina hispanica*** (Ellingsen, 1910)

BEIER 1963a: 223 (sub *M. maroccana*)

Specie mediterraneo-macaronesica nota, per l'Italia, solo della Sicilia meridionale e della Sardegna sudoccidentale; è l'unico rappresentante non cavernicolo italiano della famiglia Syarinidae. Citata dell'Isola Sant'Antioco (CALLAINI 1983b).

14) ***Garypus beauvoisi*** (Savigny & Audouin, 1826)

BEIER 1963a: 239.

Is. Santa Maria, 6.VIII.1986, R. Argano leg., 1 ♀; Is. Soffi, 3.VII.1987, R. Argano leg., 1 T; Is. dei Cavoli, 30.VII.1986, R.

Argano leg., 1 D, 1 P; Is. Sant'Antioco, Capo Sperone, 31.V.1991, G. Gardini e R. Rizzerio leg., 2 ♂♂, 1 ♀, 1 T (coll. Gardini); Is. Mal di Ventre, 3.VIII.1986, R. Argano leg., 1 T, 3 DD; id., 4.VIII.1986, C. Manicasteri leg., 1 ♂; Is. Piana dell'Asinara, 4.VIII.1986, R. Argano leg., 1 T, 1 P; Is. Asinara, Cala Arena, 1.VII.1987, R. Argano leg., 1 ♂, 1 ♀ (coll. Gardini); id., salicornieto, 23.V.2005, P. Marcia leg., 1 ♀ (coll. Gardini).

Specie alofila mediterraneo-macaronesica, vicariante ecologica (di coste sabbiose) di *G. levantinus*. Citata di pochissime località centromediterranee, senza dubbio per difetto di ricerche specializzate: Corsica (Bonifacio), Sardegna (Is. Asinara) e Isole Maltesi (GARDINI 2000). La conosco, per l'Italia, di Toscana: Parco dell'Uccellina (Grosseto), 20-21.V.1997, A. Zanetti leg., spiaggia, 1 ♂, 1 ♀, 2 juv.; Sicilia: Isola Grande dello Stagnone (Trapani), 6.V.1991, R. Argano e C. Manicasteri leg., 1 ♂, 1 T; Sardegna: Alghero (Sassari), Capo Caccia, 21.V.1982, G. Maceli leg., 1 D; Villaputzu (Cagliari), Porto Corallo, 2.VII.1986, C. Torti leg., 2 DD, 17 PP; Pula (Cagliari), Chia, spiaggia della Maddalena, 15.VIII.1997, M. Pisano leg., 1 D, 1 P (tutti in coll. Gardini). Nuova per la Toscana e per la Sicilia.

15) *Garypus levantinus* Navás, 1925

BEIER 1963a: 238; GARDINI 1975: 390.

Is. Razzoli, 30.VI.1987, R. Argano leg., 1 ♂ (coll. Gardini); Is. Serpentara, 30.VII.1986, R. Argano leg., 1 ♀, 4 TT; Isolotto il Corno, 3.VIII.1986, 1 palpo; Isolotto Il Catalano, 3.VIII.1986, 1 ♂, 2 ♀♀; Is. Asinara, Cala Sgombro, 13.X.1989, M. Cobolli leg., 1 ♀ (coll. Gardini).

Specie alofila N-mediterranea, vicariante ecologica (di coste rocciose) di *G. beauvoisi*, citata per l'Italia di Liguria, Toscana e Arcipelago Toscano, Isole Eolie, Lampedusa e Sardegna (GARDINI 2000). Di Sardegna era nota solo di Dorgali: Cala Gonone (CALLAINI 1983b); la conosco anche di Buggerru (Oristano), Capo Pecora, 30.III.1991, G. Gardini e R. Rizzerio leg., 1 ♂, 2 TT, 1 D; Santa Caterina di Pittinuri (Oristano), 26.III.1993, P. Leo leg., scogliera, 1 ♀; Gairo Marina (Nuoro), 15.V.1980, G. Gardini leg., 1 ♀ (tutti in coll. Gardini).

16) *Geogarypus nigrimanus* (Simon, 1879)

BEIER 1963a: 243.

Is. Razzoli, 30.VI.1987, al vaglio sub *Pistacia lentiscus* L., 3 ♂♂, 1 ♀; Is. Budelli, c/o Spiaggia Rosa, 10.VII.1990, 2 ♀♀; id., pendici Monte Budello, 14.XII.1993, 1 ♂; Is. La Presa, 16.X.1989, sotto lentisco, 1 ♀; Is. Spargi, Cala Granara, 6.IX.1987, 1 ♂; Is. La Maddalena, Spiaggia dei Monti della Rena, 8.IX.1987, sub *Pistacia lentiscus* L., 1 ♂; id., Cala Bassa Trinità, 14.X.1989, 1 ♀; id., Case Fangotto, 14.X.1989, 1 ♂; id., Guardia Vecchia, 14.X.1989, 1 ♂; id., Case Fangotto, 4.VII.1990, 2 ♂♂, 1 ♀; id., I Pozzoni, 14.X.1989, vaglio lentisco, 1 ♂; Is. Caprera, Forte Settentrionale, 15.X.1989, 1 ♀; id., pendici Monte Teialone, 15.X.1989, lecceta, 2 ♂♂, 1 ♀; Is. Li Nibani 1, 11.XI.1986, 1 ♂; Is. Li Nibani 2, 11.XI.1986, C. Manicastri leg., 1 ♂; Is. Li Nibani 3, 11.XI.1986, vaglio sub *Pistacia* sp., 2 ♀♀; Is. delle Rocche, 11.XI.1986, al vaglio, 2 ♀♀; Is. Poveri II, 11.IV.1986, 1 ♂; Is. Mortorio, 11.IV.1986, sub *Cistus monspe-liensis* L., 1 ♀; Isola Camere W, 11.IV.1986, al vaglio sub *Pistacia lentiscus* L., 1 ♂, 2 ♀♀; id., 3.VII.1987, 1 ♂, 1 ♀; Isola Camere E, 11.IV.1986, sub *Euphorbia dendroides* L., 1 ♂, 2 ♀♀; id., 3.VII.1987, 1 ♂; Is. Soffi, 3.VII.1987, 1 ♂, 2 ♀♀; Isola Figarolo, 10.XI.1986, vaglio sub *Pistacia* sp., 1 ♀; Is. Tavolara, 9.XI.1986, M. Bologna e R. Poggi leg., 2 ♀♀; id., 8.VI.1989, al vaglio, 1 ♂; id., versante NW, 16.X.1989, 1 ♀; id., Fornaci, 19.V.1994, 1 ♀; Is. Molarà, 8.VI.1989, vaglio sotto lentisco, 2 ♀♀; Is. Molarotto, 10.IV.1986, 1 ♀; id., 12.IX.1987, 1 ♂, 1 ♀; Is. Ogliastro, 6.VII.1990, 1 ♀; Isolotto Varaglioni, 30.VII.1986, al vaglio sub *Pistacia* sp., 1 ♀; Is. Serpentara, 30.VII.1986, sub *Pistacia lentiscus* L., 1 ♂, 1 ♀; id., 7.VII.1990, 1 ♀; Is. Il Toro, 10.V.1988, 4 ♂♂; id., 10.V.1988, sub *Ecballium elaterium* (L.), 2 ♀♀; id., 14.VI.1989, sub *Ecballium elaterium* (L.), 8 ♂♂, 7 ♀♀, 5 TT (3 ♂♂, 3 ♀♀ coll. Gardini); Is. La Vacca, 26.VI.1987, 1 ♂; id., 26.VI.1987, vaglio sub Malvacea, 3 ♂♂, 1 ♀, 1 T; id., 14.VI.1989, 1 ♀; Is. Sant'Antioco, Cala Lunga, 11.II.1984, L. Fancello e P. Leo leg., 1 ♀ (coll. Gardini); id., Stagno de Cirdu, 12.VI.1989, 2 ♂♂, 2 ♀♀; id., Sa Scrocca Manna, 13.VI.1989, 1 ♂, 2 ♀♀; Is. San Pietro, La Caletta, 11.VI.1989, 1 ♂, 2 ♀♀; id., pendici Monte Guardia dei Mori, 8.VII.1990, 1 ♂; Is. Mal di Ventre, 3.VIII.1986, 1 ♀, 2 TT; id., 28.VI.1987, 1 ♂; id., 15.VI.1989, 2 ♀♀; Is. dei Porri, 29.VI.1987, sub *Atriplex* sp., 1 ♂, 1 ♀; Is. Piana

dell'Asinara, 4.VIII.1986, 1 ♀; Is. Asinara, Cala Reale, 9.VII.1990, 2 ♂♂, 3 ♀♀.

Specie mediterraneo-macaronesica, xerofila, propria della gariga e della macchia mediterranea bassa. Nota per l'Italia di Liguria, Arcipelago Toscano, Isole Pontine, Puglia, Calabria, Sicilia, Isole Eolie e Sardegna (GARDINI 2000). La citazione di *G. minor* (L. Koch, 1873) per l'Is. Sant'Antioco (CALLAINI 1983b) è a mio avviso da riferire a *G. nigrimanus*: le due specie sono comunque da revisionare.

17) *Olpium pallipes* (Lucas, 1849)

HEURTAULT 1979: 925.

Is. dei Porri, 29.VI.1987, 1 ♂.

Specie psammoalofila mediterraneo-macaronesica nota, per l'Italia, di Liguria (probabilmente estinta), Toscana e Arcipelago Toscano, Campania, Puglia, Basilicata, Sicilia, Is. Linosa e Sardegna (GARDINI 2000). Citata da GESTRO (1904) dell'Is. di San Pietro.

18) *Calocheiridius olivieri* (Simon, 1879)

HEURTAULT 1982: 218.

Is. Razzoli, 13.XI.1986, 1 ♂, 2 ♀♀; Is. Spargi, Cala Granara, 6.VIII.1986, al vaglio, 2 ♂♂, 1 ♀, 1 T; Is. La Maddalena, I Pozzoni, 14.X.1989, vaglio lentisco, 1 ♂; Is. Caprera, Forte Settentrionale, 15.X.1989, 1 ♀; Is. delle Bisce, 11.XI.1986, 1 ♂, 1 ♀; Is. Li Nibani 1, 11.XI.1986, 1 ♂; Is. delle Rocche, 11.XI.1986, al vaglio, 1 ♂, 2 ♀♀; Is. Mortorio, 11.IV.1986, sub *Pistacia lentiscus* L., 1 ♂; Is. Camere W, 3.VII.1987, 1 ♂; Is. Soffi, 3.VII.1987, 3 ♂♂, 3 ♀♀; Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 2 ♂♂, 1 ♀; Isolotto Verde, 2.VII.1987, 1 ♂, 1 ♀; Is. Tavolara, settore SW, 9.XI.1986, 1 ♂, 1 ♀; id., 8.VI.1989, al vaglio, 1 ♂, 1 ♀; Is. Molaro, 8.VI.1989, vaglio sotto lentisco, 2 ♂♂, 2 ♀♀; Is. Molarotto, 12.IX.1987, 15 ♂♂, 16 ♀♀ (5 ♂♂, 5 ♀♀ coll. Gardini); Is. Ogliastro, 6.VII.1990, 1 ♂; Isolotto Varaglioni, 30.VII.1986, al vaglio sub *Pistacia* sp., 1 ♂; Is. Serpentara, 30.VII.1986, sub *Pistacia lentiscus* L., 5 ♂♂, 6 ♀♀, 1 T;

id., 25.VI.1987, sub *Pistacia lentiscus* L., 1 ♂; id., 3.V.1988, M. Mei leg., 1 ♂; id., 9.V.1988, 2 ♀♀; id., 9.VI.1989, *Pistacia lentiscus* L., 2 ♂♂, 4 ♀♀; Is. dei Cavoli, 30.VII.1986, 1 ♂; id., 9.VI.1989, sotto *Pistacia* sp., 1 ♂, 1 ♀; Is. La Vacca, 31.VII.1986, sub *Pistacia* sp., 2 ♀♀; id., 26.VI.1987, R. Poggi e V. Cottarelli leg., 1 ♂, 1 ♀; id., 26.VI.1987, vaglio sub Malvacea, 2 ♂♂, 1 ♀, 3 TT; id., 10.V.1988, 1 ♂, 2 ♀♀; Is. Sant'Antioco, Stagno de Cirdu, 12.VI.1989, 6 ♂♂, 6 ♀♀; id., Triga, 12.VI.1989, sub *Pistacia* sp., 1 ♂; Is. San Pietro, pendici Monte Guardia dei Mori, 27.VI.1987, 1 ♀; id., Bacino Acquedotto, 12.V.1988, 2 ♀♀; id., La Caletta, 11.VI.1989, 1 ♂, 1 ♀; Isolotto Il Catalano, 3.VIII.1986, 1 ♀; Is. Piana di Alghero, 15.VI.1989, 1 ♀; Is. Asinara, Diga Ruda, 15.V.1988, 1 ♂; id., Campu Perdu, 15.V.1988, 1 ♂.

Specie xerofila nota sinora della Francia meridionale e della Sardegna. *Olpium olivieri* Simon, 1879, descritta su esemplari dell'Île de Porquerolles (Îles d'Hyères, Var), venne ridescritta e trasferita nel genere *Calocheiridius* Beier & Turk, 1952 da HEURTAULT (1982). Il genere *Calocheiridius*, istituito per *C. mavromoustakisi* Beier & Turk, 1952 (Cipro), comprende 31 specie nell'area afrotropicale-indo-mediterranea e, di queste, solo due erano note, sino al 1982, del Mediterraneo: *C. mavromoustakisi*, segnalata anche di Creta, Italia peninsulare e Sicilia e *C. libanoticus* Beier, 1955, descritta del Libano e citata dell'Italia peninsulare, Sicilia, Sardegna, Malta, Grecia, Turchia, Israele e Azerbaijan (HARVEY 1991; GARDINI 2000). Come già sottolineato in altra sede (GARDINI 2000), le conoscenze tassonomiche di questo gruppo di specie sono del tutto insufficienti ed è assai probabile che le citazioni relative a popolazioni del Mediterraneo centro-occidentale, sinora attribuite a *C. mavromoustakisi* e a *C. libanoticus*, debbano essere attribuite a *C. olivieri*. Non citata in precedenza di isole circumsarde.

19) *Amblyolpium dollfusi* Simon, 1898

LAZZERONI 1970: 106; SCHAWALLER 1981: 46.

Is. Razzoli, Cala della Noce, 10.VII.1990, 1 ♀, 1T; Is. La Presa, 16.X.1989, sotto lentisco, 1 ♀, 1 D; Is. Mortorio, 3.VII.1987, 1 ♀; Is. Tavolara, versante NW, 29.VII.1986, 1 ♂; id., 8.VI.1989,

al vaglio, 7 ♂♂, 7 ♀♀, 1 T; id., settore SW, 19.V.1994, sotto lentisco, 6 ad., 1 T (3 ad. coll. Gardini); Is. Molara, 28.VII.1986, 1 ♂, 1 D; id., 8.VI.1989, vaglio sotto lentisco, 1 T; Isolotto Varaglioni, 30.VII.1986, al vaglio sub *Pistacia* sp., 1 ♂; Is. dei Cavoli, 9.VI.1989, sotto *Pistacia* sp., 1 ♀; Is. La Vacca, 31.VII.1986, sub *Pistacia* sp., 1 ♂, 1 T; id., 26.VI.1987, 1 ♂, 1 ♀; id., 10.V.1988, 1 ♂; Is. Mal di Ventre, 3.VIII.1986, 1 ♂, 1 ♀; id., 28.VI.1987, 1 ♂, 1 ♀; id., 15.VI.1989, 14 ♂♂, 6 ♀♀ (4 ♂♂, 1 ♀ coll. Gardini); Is. Piana di Alghero, 29.VI.1987, 1 ♀; Is. Piana dell'Asinara, 4.VIII.1986, 2 ♂♂, 2 ♀♀, 1 T.

Specie tirrenica, xerofila della gariga e della macchia mediterranea bassa, nota di Francia meridionale, Arcipelago Toscano, Calabria, Sardegna, Corsica (GARDINI 2000) e Sicilia: env. Caltabellotta (Agrigento), 850 m, 22.VIII.1993, V. Mahnert leg., tamisage *Quercus ilex* L., 1 es. (coll. Gardini). Non ancora citata di isole circumsarde e nuova per la Sicilia.

20) *Hysterochelifer tuberculatus* (Lucas, 1849)

BEIER 1963a: 285.

Is. Razzoli, Cala della Noce, 10.VII.1990, 2 TT; Is. Budelli, dintorni Spiaggia Rosa, 10.VII.1990, 1 ♀, 1 T; id., pendici Monte Budello, 14.XII.1993, 1 T; Is. La Presa, 13.XI.1986, 2 TT, 1 D; id., 16.X.1989, sotto lentisco, 1 D; Is. Barrettini, 5.VIII.1986, al vaglio sub *Lavatera* sp., 1 T; Is. Spargi, Cala Granara, 6.VIII.1986, al vaglio, 1 ♂; id., Cala Granara, 6.IX.1987, 1 ♀, 1 T; id., Cala Granara, 16.X.1989, 2 ♂♂, 1 ♀, 1 T, 2 DD; Is. La Maddalena, Spiaggia dei Monti della Rena, 8.IX.1987, sub *Pistacia lentiscus* L., 3 ♂♂, 4 ♀♀, 1 T, 2 DD, 1 P; id., Spalmatore, 18.VI.1989, 2 ♂♂; id., Guardia Vecchia, 14.X.1989, 1 ♀; id., I Pozzoni, 14.X.1989, vaglio lentisco, 1 ♀; id., Cala Bassa Trinità, 14.X.1989, 1 ♀; id., Case Fanguetto, 4.VII.1990, 2 ♂♂, 1 ♀, 3 TT; Is. Caprera, Fonte Teialone, 7.IV.1986, sub *Quercus ilex* L., 1 D; id., 12.XI.1986, M. Bologna leg., 1 ♀; id., pendici Monte Teialone, 15.X.1989, lecceta, 2 ♂♂, 1 ♀, 1 D; id., Fosso di Stefano, 5.VII.1990, 1 ♂, 1 ♀, 1 P; id., Forte Settentrionale, 5.VII.1990, sotto corbezzolo, 3 ♀♀; Is. Santo Stefano, 12.XI.1986, 1 ♂; id., 6.IX.1987, 1 T; id., Forte San Giorgio,

17.VI.1989, sotto mirto, 1 ♂, 1 T; Is. delle Bische, 11.XI.1986, 1 T; Is. Soffi, 3.VII.1987, 1 ♂, 1 ♀, 2 TT, 2 DD, 3 PP; Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 1 ♀, 2 TT; id., 10.XI.1986, 2 ♀♀, 1 D; id., 10.XI.1986, vaglio sub *Pistacia* sp., 1 ♂, 1 T; id., 11.IX.1987, 2 ♂♂, 1 D; Is. Tavolara, 8.IV.1986, 1 ♂, 1 ♀, 1 T; id., settore SW, 9.XI.1986, al vaglio, 6 ♀♀; id., 13.IX.1987, vaglio sub *Ficus carica* L., 1 T; id., 8.VI.1989, al vaglio, 2 ♂♂, 4 ♀♀, 5 TT, 1 D; id., versante NW, 16.X.1989, 2 DD; id., settore SW, 19.V.1994, sotto lentisco, 2 ♀♀, 1 T; id., Fornaci, 19.V.1994, 1 ♂, 1 ♀, 1 D; Is. Molaro, 9.IV.1986, sub *Quercus ilex* L., 1 ♂; id., 9.IV.1986, sub *Acer* sp., 1 ♂; id., 28.VII.1986, 1 ♂; id., 8.VI.1989, vaglio sotto lentisco, 2 ♂♂, 2 ♀♀, 5 TT; Is. Serpentara, 20.VII.1986, M. Meileg., al vaglio, 1 T; id., 30.VII.1986, sub *Pistacia lentiscus* L., 2 ♂♂, 2 ♀♀, 1 T, 2 DD; id., 25.VI.1987, sub *Pistacia lentiscus* L., 6 ♂♂, 2 ♀♀, 1 P; id., 8.V.1988, al vaglio lentisco, 1 ♂, 1 ♀, 3 TT, 1 D; id., 9.VI.1989, *Pistacia lentiscus* L., 5 ♂♂, 2 ♀♀, 2 TT, 1 D; id., 7.VII.1990, 4 ♂♂, 1 ♀, 5 TT; Is. dei Cavoli, 30.VII.1986, al vaglio, 3 ♂♂; Is. La Vacca, 31.VII.1986, sotto sasso con nido di *Pheidole pallidula* Nyl., 1 D; id., 26.VI.1987, 1 ♀; id., 26.VI.1987, vaglio sub Malvacea, 1 ♂, 1 T, 1 D; Is. Sant'Antioco, Triga, 12.VI.1989, sub *Pistacia* sp., 1 ♀, 1 D; id., Stagno de Cirdu, 12.VI.1989, 3 ♂♂, 2 ♀♀, 4 TT, 3 DD; id., Sa Scrocca Manna, 13.VI.1989, 1 ♂, 1 ♀; Is. San Pietro, pendici Monte Guardia dei Mori, 27.VI.1987, 1 ♂, 1 ♀; id., Monte Guardia dei Mori, 12.V.1988, 1 ♂, 1 ♀; id., pendici Monte Guardia dei Mori, 10.VI.1989, 3 DD, 2 PP; id., Cala Vinagra, 10.VI.1989, 3 ♂♂, 3 ♀♀, 1 T, 5 DD; id., Monte Guardia dei Mori, 11.VI.1989, al vaglio, 5 ♀♀, 2 TT, 3 DD; id., NW de Le Colonne, 11.VI.1989, lentisco, 1 ♀; id., pendici Monte Guardia dei Mori, 8.VII.1990, 3 TT; Is. Mal di Ventre, 3.VIII.1986, al vaglio, 2 ♂♂, 2 TT, 1 D; id., 28.VI.1987, 1 ♂, 1 ♀; Is. dei Porri, 29.VI.1987, sub *Atriplex* sp., 1 ♂, 2 ♀♀, 1 T, 1 D, 2 PP; Is. Piana dell'Asinara, 4.VIII.1986, 1 ♂, 1 ♀, 1 T, 1 D, 1 P; Is. Asinara, dintorni Tumbarino, 13.X.1989, 2 ♂♂, 1 ♀, 2 DD; id., dintorni Tumbarino, 13.X.1989, sotto *Euphorbia dendroides* L., 1 ♀.

Specie mediterranea nota di quasi tutte le regioni d'Italia (GARDINI 2004) comune, in quelle centro-meridionali, in formazioni vegetazionali della macchia mediterranea. Già nota dell'Is. Asinara (ELLINGSEN 1909) e dell'Is. Sant'Antioco (CALLAINI 1983b).

21) *Dactylochelifer latreillii* (Leach, 1817)

BEIER 1963a: 291; MAHNERT 1977: 68.

Is. Budelli, Stagno, 10.VII.1990, 1 D; Is. Spargi, Cala Granara, 6.VIII.1986, al vaglio, 1 T; Is. Sant'Antioco, Cala Lunga, 12.VI.1989, 1 ♀, 1 juv.; Is. Asinara, Cala Arena, 1.VII.1987, 4 ♂♂, 4 ♀♀; id., Cala Arena, 12.X.1989, 1 ♂, 2 ♀♀, 1 T; id., Fornelli, 9.VII.1990, 1 ♀.

Specie euro-mediterraneo-macaronesica nota di buona parte delle regioni d'Italia (GARDINI 2000). Non ancora citata di isole circumsarde.

22) *Rhacochelifer corcyrensis* (Beier, 1930)

BEIER 1963a: 296; MAHNERT 1977: 69.

Is. Tavolara, 9.XI.1986, 1 ♂.

Specie mediterranea centro-orientale citata, per l'Italia, del Veneto e di Puglia (GARDINI 2000). Nuova per la Sardegna.

23) *Rhacochelifer maculatus* (L. Koch, 1873)

BEIER 1963a: 294; HEURTAULT 1980: 161.

Is. Budelli, dintorni Spiaggia Rosa, 10.VII.1990, 1 ♂; Is. La Maddalena, Cala Bassa Trinità, 14.X.1989, 1 ♂; id., Case Fangotto, 4.VII.1990, 1 ♀, 1 T; Is. Serpentara, 9.V.1988, 1 ♂, 1 T; id., 9.VI.1989, *Pistacia lentiscus* L., 2 ♂♂, 1 T, 1 D; id., 7.VII.1990, 2 ♂♂; Is. Il Toro, 31.VII.1986, V. Cottarelli leg., 1 ♀; Is. Sant'Antioco, Triga, 12.VI.1989, sub *Pistacia* sp., 1 ♀; Is. San Pietro, pendici Monte Guardia dei Mori, 27.VI.1987, 1 ♂.

Specie mediterraneo-macaronesica nota, per l'Italia, di Veneto, Lombardia, Liguria, Toscana e Arcipelago Toscano, Marche, Lazio, Abruzzo, Puglia, Calabria, Sicilia e Sardegna (GARDINI 2000). Non ancora citata di isole circumsarde.

24) *Rhacochelifer* sp. prope *maculatus* (L. Koch, 1873)

Is. Caprera, Forte Settentrionale, 15.X.1989, 1 T; Is. Tavolara, 9.XI.1986, 1 T; Is. Il Toro, 10.V.1988, 2 es.; id., 14.VI.1989, sotto *Ecballium elaterium* L., 3 ♀♀, 2 TT; Is. La Vacca, 31.VII.1986, sub *Pistacia* sp., 1 ♀; id., 26.VI.1987, 4 ♂♂, 2 ♀♀, 3 TT (+1 ♂, 1 ♀ coll. Mus. Ginevra); id., 26.VI.1987, vaglio sub Malvacea, 2 ♂♂; id., 14.VI.1989, 1 ♀, 3 TT; Is. Sant'Antioco, Stagno de Cirdu, 12.VI.1989, 1 ♂; Is. Mal di Ventre, 3.VIII.1986, 1 ♀, 1 T; Is. Foradada, 29.VI.1987, 1 ♂; Is. Asinara, alta Valle Rio Baddi Longa, 14.V.1988, lecceta, 1 ♂.

Popolazioni che differiscono da *R. maculatus* per la forma dei palpi, nel complesso più tozzi, e per l'assenza di grossi granuli sulla superficie mediale del femore e della patella degli stessi. Lo statumen convolutum dei ♂♂ è tuttavia pressoché identico a quello di *R. maculatus*, mentre la placca cribrosa delle ♀♀ è un poco più dilatata apicalmente rispetto a quella di *R. maculatus*. La sympatria con *R. maculatus* sull'Is. Il Toro e a Sant'Antioco avvalora la supposizione che si tratti di una specie inedita, la cui descrizione è da subordinarsi, in altra sede, ad una attenta revisione delle popolazioni mediterranee di *R. maculatus*.

25) *Pselaphochernes italicus* Beier, 1966

BEIER 1966: 109.

Is. Caprera, Invaso Ferracciolo, 8.IX.1987, 1 ♀; Is. delle Bische, 11.XI.1986, V. Cottarelli leg., 2 ♂♂; Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 2 ♂♂.

Specie descritta di Campania: Ascea, Scavi di Velia (BEIER 1966) e citata di Sardegna, dubitativamente, da CALLAINI (1983b). Prima segnalazione per le isole circumsarde.

26) *Pselaphochernes lacertosus* (L. Koch, 1873)

BEIER 1963a: 254.

Is. Caprera, Invaso Ferracciolo, 5.VII.1990, 2 ♂♂, 1 ♀, 1 D; Is. Poveri 1, 11.IV.1986, sub *Lavatera* sp., 4 ♂♂, 12 ♀♀, 3 TT, 1

D, 1 P; Is. Tavolara, 9.XI.1986, M. Bologna e V. Cottarelli leg., 1 ♂, 4 ♀♀; Is. La Vacca, 26.VI.1987, 1 ♂, 1 ♀; id., 10.V.1988, 1 ♀, 2 TT; Is. San Pietro, Cala Vinagra, 8.VIII.1986, C. Manicastro leg., 1 ♀; id., Isola Piana, 12.VI.1989, N. Baccetti leg., 1 ♀, 1 T; id., pendici Monte Guardia dei Mori, 8.VII.1990, 4 ♂♂, 5 ♀♀, 1 D.

Specie mediterraneo-macaronesica nota, per l'Italia, di Veneto, Liguria, Arcipelago Toscano, Lazio, Puglia, Sicilia, Isole Eolie e Sardegna (GARDINI 2000). Non ancora citata di isole circumsarde.

27) *Atemnus politus* (Simon, 1878)

BEIER 1963a: 247.

Is. Figarolo, 28.VII.1986, al vaglio sub *Pistacia* sp., 1 ♀, 1 T; Is. dei Cavoli, 9.VI.1989, sotto *Pistacia* sp., 2 ♀♀; Is. La Vacca, 31.VII.1986, sub *Pistacia* sp., 5 TT; id., 26.VI.1987, 9 ♂♂, 5 ♀♀, 3 TT, 1 D; id., 10.V.1988, 5 ♂♂, 1 ♀; id., 14.VI.1989, 3 ♂♂, 4 ♀♀, 5 TT; Is. Sant'Antioco, Su Pruni, 11.V.1988, 2 ♀♀, 1 T; id., Cala Lunga, 12.VI.1989, 4 ♂♂, 1 ♀; id., Cala Lunga, 13.VI.1989, sotto lentisco, 3 ♂♂, 1 ♀; Is. Mal di Ventre, 3.VIII.1986, 1 ♀, 1 T; id., 28.VI.1987, 2 ♀♀, 3 TT; id., 15.VI.1989, 1 ♂, 2 ♀♀; Is. Piana di Alghero, 29.VI.1987, 2 ♂♂; id., 29.VI.1987, sub *Pistacia lentiscus* L., 6 ♀♀, 1 P; Is. dei Porri, 29.VI.1987, sub *Atriplex* sp., 2 ♂♂, 6 ♀♀, 3 TT; Is. Asinara, Cala Arena, 1.VII.1987, 2 ♂♂, 2 ♀♀, 1 T; id., Cala Arena, 1.VII.1987, R. Argano leg., 2 ♂♂, 1 ♀ (coll. Gardini); id., Cala Arena, 9.IX.1987, 2 ♂♂, 1 ♀; id., Cala Arena, 12.X.1989, 1 ♂; id., Cala Arena, 12.X.1989, vaglio lentisco, 1 ♂, 2 ♀♀, 3 DD; id., Monte Scomunica, 12.X.1989, lecceta, 1 ♀, 3 TT; id., dintorni Tumbarino, 13.X.1989, sotto *Euphorbia dendroides* L., 1 ♂, 1 ♀, 1 T; id., Cala Reale, 9.VII.1990, 2 ♂♂, 4 ♀♀, 3 TT; Is. Scombro, 13.X.1989, 3 ♂♂, 1 ♀, 7 DD.

Specie centroasiatico-mediterraneo-macaronesica già citata, per l'Italia, di Liguria, Emilia-Romagna, Toscana, Lazio, Abruzzo, Puglia e Isole Tremiti, Calabria, Sicilia e Isole Eolie, Is. Pantelleria, Is. Linosa e Sardegna (GARDINI 2000). Già nota dell'Is. Sant'Antioco (CALLAINI 1983b).

CONCLUSIONI

Tra le regioni d'Italia, intesa in senso geografico e quindi incluse la Corsica e le Isole Maltesi, la Sardegna è quella di cui è noto a tutt'oggi il maggior numero di specie di Pseudoscorpioni: 73 su 218, cioè il 33,5% dell'intero popolamento (GARDINI 2000, aggiornato). Ben 28 (il 38%) sono endemiche dell'isola e, di queste, 20 sono cavernicole e le restanti 8 epigee; le altre 45 specie, di cui 2 sole troglofile, presentano nel complesso corotipi mediterranei, W-mediterranei o tirrenici, poche (8) sono più ampiamente diffuse nella regione W-paleartica.

Sulle isole circumsarde sono state rinvenute 27 specie (tab. I): 24 sono presenti anche in Sardegna e le tre non ancora note dell'isola madre (*Chthonius* sp. prope *elbanus*, *Rhacochelifer corcyrensis* e *R.* sp. prope *maculatus*) vi saranno molto probabilmente rinvenute in futuro. L'Isola di Tavolara è l'unica che ospita popolazioni troglobie attribuibili, o strettamente affini, a due specie cavernicole presenti in Sardegna: *Spelyngochthonius sardous* e *Roncus turritanus*. Il debole differenziamento morfologico rilevabile nei pochi esemplari a disposizione non consente di trarre considerazioni tassonomiche certe (cfr. GARDINI in stampa per *S. sardous*) e ritengo comunque sia conseguenza dell'isolamento carsico, e non marittimo, dal momento che Tavolara risulta effettivamente separata dalla Sardegna da non più di 8000 anni (ANTONIOLI & TRAINITO 2005).

L'esame dei corotipi delle specie delle isole circumsarde (tab. I), intesi nel senso di VIGNA TAGLIANTI *et al.* (1999), ripropone quanto già constatato a proposito delle specie presenti in Sardegna: quelli dominanti sono i corotipi mediterranei s. l. e i tirrenici (11 e 3) a cui seguono gli endemici sardi (5), gli euro-mediterranei (4), i turano-mediterranei (1) e i centroasiatico-mediterranei (1). Due specie (*Chthonius* sp. prope *elbanus* e *Rhacochelifer* sp. prope *maculatus*) hanno corotipo non definibile.

Le presenze di *Roncus caralitanus* e *Microcreagrina hispanica* nelle piccole isole sudoccidentali sottolineano la peculiarità del popolamento sulcitano, mentre la presenza di *Chthonius berninii* sull'Isola Serpentara e su Il Toro conferma l'endemicità della specie nella Sardegna meridionale.

Le altre 24 specie sono distribuite in tutti i settori in cui sono ripartite le isole circumsarde ed è evidente, dall'esame della tab. I, che le isole più estese, e quindi con più elevata diversità ambien-

Tab. I - Pseudoscorpioni presenti nelle isole circumsarde. Le specie sono elencate in ordine sistematico, le isole in ordine geografico da NE a NW. Sono indicati inoltre: i sette gruppi di isole definiti con criterio geografico (prima riga), la

			Arcipelago de La Maddalena										N-E				
	ISOLA →	← COROTIPO	Is. Razzoli	Is. Budelli	Is. S. Maria	Is. La Presa	Is. Barrettini	Is. Spargi	Is. La Maddalena	Is. Caprera	Is. S. Stefano	Is.to Roma	Is. d. Bisce	Is. Li Nibani 1	Is. Li Nibani 2	Is. Li Nibani 3	Is. d. Rocche
	km ² →		1,67	1,72	1,9	0,28	0,11	4,2	20,11	15,75	3,05	0,01	0,34	0,02	0,07	0,03	0,02
1	<i>Chthonius ischnocheles</i>	EUM							X								
2	<i>Chthonius tenuis</i>	EUM						X	X	X	X		X				X
3	<i>Chthonius berninii</i>	SARD															
4	<i>Chthonius elbanus</i>	WME							X								
5	<i>Chthonius</i> sp. prope <i>elbanus</i>	?												X			X
6	<i>Chthonius gibbus</i>	WME							X								
7	<i>Chthonius tetrachelatus</i>	EUM															
8	<i>Spelyngochthonius sardous</i>	SARD															
9	<i>Neobisium incertum</i>	SARD		X				X	X	X		X	X	X			
10	<i>Roncus abditus</i>	TYRR	X	X		X		X	X	X	X	X	X	X		X	X
11	<i>Roncus caralitanus</i>	SARD															
12	<i>Roncus</i> sp. prope <i>turritanus</i>	SARD															
13	<i>Microcreagrina hispanica</i>	MED															
14	<i>Garypus beauvoisi</i>	MED			X												
15	<i>Garypus levantinus</i>	MED	X														
16	<i>Geogarypus nigrimanus</i>	MED	X	X		X		X	X	X				X	X	X	X
17	<i>Olpium pallipes</i>	MED															
18	<i>Calocheiridius olivieri</i>	WME	X					X	X	X			X	X			X
19	<i>Amblyolpium dollfusi</i>	TYRR	X			X											
20	<i>Hysterochelifer tuberculatus</i>	MED	X	X		X	X	X	X	X	X		X				
21	<i>Dactylochelififer latreillii</i>	EUM		X				X									
22	<i>Rhacochelififer corcyrensis</i>	MED															
23	<i>Rhacochelififer maculatus</i>	MED		X					X								
24	<i>Rhacochelififer</i> sp. prope <i>maculatus</i>	?								X							
25	<i>Pselaphochernes italicus</i>	TYRR								X			X				
26	<i>Pselaphochernes lacertosus</i>	TUM								X							
27	<i>Atemnus politus</i>	CAM															
	N° SPECIE/ISOLA →		6	6	1	4	1	7	10	9	3	2	6	5	1	2	5

superficie di ciascuna isola in km² (terza riga), il numero di specie presente in ciascuna isola (ultima riga), il corotipo di ogni specie (seconda colonna), il numero di isole in cui ciascuna specie è presente (ultima colonna).

N-E							Arc.Tavolara				S-E				S-W					W		N-W							N° ISOLE/SPECIE
Is. Poveri 1	Is. Poveri 2	Is. Mortorio	Is. d. Camere W	Is. d. Camere E	Is. Soffi	Is. Figarolo	Is.to Verde	Is. Tavolara	Is. Molara	Is. Molarotto	Is. d. Ogliastro	Is.to Varaglioni	Is. Serpentara	Is. d. Cavoli	Is. Il Toro	Is. La Vacca	Is. S. Antioco	Is. S. Pietro	Is.to Il Corno	Is. d. Ratti	Is.to Il Catalano	Is. Mal di Ventre	Is. Foradada	Is. Piana Alghero	Is. d. Porri	Is. Piana Asinara	Is. Asinara	Is. Scombro	
0,009	0,003	0,56	0,03	0,05	0,42	0,22	0,002	5,88	3,41	0,03	0:06	0,03	0,29	0,42	0,13	0,09	108,8	51,33	0,002	0,01	0,01	0,86	0,05	0,13	0,04	1,2	50,9	0,03	←
																	X										X		2
													X		X														7
						X		X	X																				2
								X	X																				4
					X																								3
																		X									X		3
									X				X					X											3
								X																					1
			X					X	X								X	X									X		13
		X	X	X	X	X		X	X				X														X		21
														X	X	X	X	X		X									6
								X																					1
																	X												1
					X									X			X					X				X	X		7
													X						X		X						X		5
	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X				X				X	X	X	30
																									X				1
		X	X		X	X	X	X	X	X	X	X	X	X		X	X	X			X			X			X		25
		X						X	X			X		X		X						X		X		X			11
					X	X		X	X				X	X		X	X	X				X			X	X	X		22
																	X										X		4
								X																					1
													X		X		X	X											6
								X							X	X	X					X	X				X		8
						X																							3
X								X								X		X											5
						X								X		X	X					X		X	X		X	X	9
1	1	4	4	2	6	7	1	12	8	2	2	3	8	6	5	8	12	9	1	1	2	6	1	3	4	4	12	1	

tale, sono quelle che ospitano il maggior numero di specie. È il caso delle isole Molara, Spargi, Tavolara, Caprera, La Maddalena, Asinara, San Pietro e Sant'Antioco, con superficie compresa tra 3,4 e 109 km² e numero di specie compreso tra 7 e 12. Non sempre però vi è correlazione diretta superficie/numero di specie: di Santo Stefano (3,05 km²) ne sono note solo 3, mentre di La Vacca (0,09 km²) e di Serpentara (0,29 km²) se ne conoscono ben 8. È probabile che siano intervenute variabili nei tempi o nelle condizioni di raccolta, al momento non valutabili, che hanno reso contraddittori alcuni risultati.

La distanza dall'isola madre sembra non avere influito sulla composizione qualitativa e neppure quantitativa dei singoli popolamenti microinsulari: basti per tutti ancora l'esempio di Santo Stefano, che dista dalle coste sarde solo 1 km, mentre La Vacca ne dista 12, Serpentara 3,2 e addirittura Il Toro, di cui sono note 5 specie, 17,1 km.

Sei specie (su 27) sono presenti in almeno 10 delle 44 isole circumsarde indagate (tab. I): *Geogarypus nigrimanus* (nota di 30 isole), *Calocheiridius olivieri* (25), *Hysterochelifer tuberculatus* (22), *Roncus abditus* (21), *Neobisium incertum* (13) e *Amblyolpium dollfusi* (11). Tre di queste (*R. abditus*, *N. incertum* e *H. tuberculatus*) hanno in Sardegna valenza ecologica relativamente ampia nell'ambito delle formazioni vegetazionali della macchia mediterranea; le altre tre, più stenoecie, sono proprie della macchia bassa e della gariga. È lecito supporre che anche altre specie stenoecie siano diffuse in buona parte delle piccole isole circumsarde, ove presenti gli ambienti idonei. È il caso di *Garypus levantinus*, specie alofila e termofila (HEURTAULT & VANNIER 1990) delle coste rocciose, citata di sole 5 isole, senz'altro presente in quasi tutte le altre ma reperibile solo a seguito di ricerche mirate.

Non sono state rinvenute specie ubiquiste indicatrici di ambienti degradati ed eccessivamente antropizzati, con l'eccezione di *Chthonius ischnocheles*, limitatamente antropofila, nota solo dell'Asinara e della Maddalena.

NOTA

A lavoro ultimato e già in composizione ho avuto modo di reperire 1 ♀ e 1D di *Paraliochthonius singularis* (Menozzi, 1924) sull'Isola di Caprera, Cala Napoletana, 24.IV.2008, in scogliera sotto pietre presso il mare (coll. G. Gardini). Specie alofila N-mediterranea-orientale nota per l'Italia di Liguria, Arcipelago Toscano, Campania, Isole Eolie e Sardegna (Cagliari e Dorgali: Cala Gonone) (GARDINI 1994, 2000). Non ancora citata di isole circumsarde.

BIBLIOGRAFIA

- ANTONIOLI F. & TRAINITO E., 2005 - I solchi di battente di Tavolara e del Golfo di Orosei: nuovi dati e loro significato paleoambientale - <http://clima.casaccia.enea.it/staff/antonioli/Articoli/40.pdf>
- BACCETTI B., COBOLLI SBORDONI M. & POGGI R., 1989 - Ricerche zoologiche della nave oceanografica "Minerva" (C. N. R.) sulle isole circumsarde. I. Introduzione - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 87: 127-136.
- BEIER M., 1963a - Ordnung Pseudoscorpionidea (Afterscorpione) - *Bestimmungsbücher zur Bodenfauna Europas*, 1, Akademie-Verlag, Berlin, 313 pp.
- BEIER M., 1963b - Pseudoscorpione aus dem Museum „Enrico Caffi“ in Bergamo - *Rend. Ist. lomb. Sc. Lett.*, Milano, 97 B: 147-156.
- BEIER M., 1966 - Ein neuer *Pselaphochernes* (Pseudoscorp.) aus Südtalien - *Fragm. ent.*, Roma, 4: 109-111.
- CALLAINI G., 1983a - Notulae Chernetologicae. XI. Il sottogenere *Ephippiochthonius* in Sardegna (Arachnida, Pseudoscorpionida, Chthoniidae) - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 84: 401-423.
- CALLAINI G., 1983b - Notulae Chernetologicae. XII. Nuovi reperti sugli Pseudoscorpioni della Sardegna - *Lavori Soc. it. Biogeogr.*, Forlì, n.s., 8 (1980): 279-322.
- ELLINGSEN E., 1909 - Contribution to the knowledge of the Pseudoscorpions from the material belonging to the Museo Civico in Genova - *Annali Mus. civ. St. nat. Genova*, 44: 205-220.
- GARDINI G., 1975 - Pseudoscorpioni dell'Isola di Capraia (Arcipelago Toscano) - *Lavori Soc. it. Biogeogr.*, Forlì, n.s., 5 (1974): 385-396.
- GARDINI G., 1980 - Identità di *Chthonius tetrachelatus fuscimanus* Simon, 1900 e ridecrizione di *C. (E.) nanus* Beier, 1953 (Pseudoscorpionida Chthoniidae) (Pseudoscorpioni d'Italia. XI) - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 88: 261-270.
- GARDINI G., 1981 - *Roncus caralitanus* n.sp. della Sardegna meridionale (Pseudoscorpionida Neobisiidae) (Pseudoscorpioni d'Italia. XIII) - *Boll. Soc. ent. it.*, Genova, 113: 129-135.
- GARDINI G., 1993 - *Chthonius (E.) poseidonis* (Pseudoscorpionida, Chthoniidae) nuova specie cavernicola della Nurra (Sardegna nord-occidentale) (Pseudoscorpioni d'Italia. XXVI) - *Boll. Soc. sarda Sc. nat.*, Sassari, 29: 75-83.
- GARDINI G., 1994 - I generi *Paraliochthonius* Beier, 1956 e *Spelyngochthonius* Beier, 1955 in Italia (Pseudoscorpionida, Chthoniidae) (Pseudoscorpioni d'Italia XXIX) - *Fragm. ent.*, Roma, 26: 1-10.
- GARDINI G., 2000 - Catalogo degli Pseudoscorpioni d'Italia (Arachnida) (Pseudoscorpioni d'Italia XXXIV) - *Fragm. ent.*, Roma, 32 (suppl.): 1-181.
- GARDINI G., 2004 - Note faunistiche e tassonomiche sugli Pseudoscorpioni (Arachnida) epigei. (Pseudoscorpioni d'Italia XXXV) - In: Latella L. (ed.). Il Monte Pastello. *Mem. Mus. civ. St. nat. Verona* - 2^a. Serie, Monografie Naturalistiche, 1: 123-133.
- GARDINI G., in stampa - Pseudoscorpioni d'Italia XLII. Chthoniidae cavernicoli di Sardegna (Pseudoscorpiones) - *Mem. Soc. ent. it.*, Genova, 87
- GARDINI G. & RIZZERIO R., 1985 - Materiali per una revisione del genere *Roncus* L.

- Koch, 1873. I. Ridescrizione dei tipi di alcune specie italiane non cavernicole (Pseudoscorpionida, Neobisiidae) - *Fragm. ent.*, Roma, 18: 47-79.
- GESTRO R., 1904 - Una gita in Sardegna. Divagazioni biogeografiche - *Boll. Soc. geogr. it.*, Roma, (4) 5 (4): 1-39.
- GRAFITTI G. & MUCEDDA M., 1996 - Le grotte dell'Isola di Tavolara e la loro fauna - *Biogeographia*, Siena, 18 (1995): 51-62.
- GRAFITTI G., LACANA G., LORU R. & MUCEDDA M., 1996 - Trent'anni del Gruppo Speleologico Sassarese - *Boll. Gruppo Spel. Sass.*, Sassari, 16: 60-68.
- HARVEY M. S., 1991 - Catalogue of the Pseudoscorpionida - Manchester University Press, Manchester & New York, 726 pp.
- HEURTAULT J., 1979 - Complément à la description de *Olpium pallipes* Lucas, 1845, type de la famille Olpiidae (Arachnides, Pseudoscorpions) - *Rev. suisse Zool.*, Genève, 86: 925-931.
- HEURTAULT J., 1980 - Quelques remarques sur les espèces françaises du genre *Rhachochelifer* Beier (Arachnides, Pseudoscorpions, Cheliferidae) - *Bull. Mus. natn. Hist. nat.*, Paris, Sect. A, (4) 2: 161-173.
- HEURTAULT J., 1982 - Présence et signification dans la France méditerranéenne des espèces des genres *Beierochelifer*, *Cheirochelifer* et *Calocheiridius* (Arachnides, Pseudoscorpions) - *Atti Soc. tosc. Sc. nat., Mem.*, Pisa, (B) 88 (1981)(suppl.): 209-222.
- HEURTAULT J. & VANNIER G., 1990 - Thermorésistance chez deux Pseudoscorpions (Garypidae), l'un du désert de Namibie, l'autre de la région de Gênes (Italie) - *Acta zool. fenn.*, Helsinki, 190: 165-171.
- LAZZERONI G., 1970 - Ricerche sugli Pseudoscorpioni. V. L'Isola di Giannutri - *Atti Soc. tosc. Sc. nat., Mem.*, Pisa, (B) 76: 101-112.
- MAHNERT V., 1977 - Über einige Atemnidae und Cheliferidae Griechenlands (Pseudoscorpiones) - *Mitt. schweiz. ent. Ges.*, Zürich, 50: 67-74.
- SCHAWALLER W., 1981 - Pseudoskorpione von Korsika (Arachnida Pseudoscorpionidea) - *Ent. basil.*, Basel, 6: 42-51.
- VIGNA TAGLIANTI A., AUDISIO P. A., BIONDI M., BOLOGNA M. A., CARPANETO G. M., DE BIASE A., FATTORINI S., PIATTELLA E., SINDACO R., VENCHI A. & ZAPPAROLI M., 1999 - A proposal for chorotype classification of the Near East fauna, in the framework of the Western Palearctic region - *Biogeographia*, Siena, 20: 31-59.

RIASSUNTO

Sono illustrati i risultati delle ricerche zoologiche della nave oceanografica "Minerva" del C. N. R. effettuate sulle isole circumsarde tra il 1986 e il 1994. Su 44 isole sono state rinvenute 27 specie di Pseudoscorpioni, cioè il 37,5% dell'intero popolamento sardo, che è costituito attualmente da 72 specie, di cui 18 cavernicole e 28 endemiche. Delle specie presenti nelle isole circumsarde, 24 sono conosciute anche dell'isola maggiore. Le specie a corologia mediterranea s. l. e tirrenica sono 14, 5 sono endemiche, 4 euro-mediterranee, 1 turano-mediterranea, 1 centroasiatico-mediterranea e 2 con corotipo non definibile. È analizzato il popolamento in relazione alla superficie delle isole circumsarde e alla conseguente diversità ambientale e si sottolinea il fatto che non sempre vi è correlazione diretta tra superficie e

numero di specie; anche la distanza dall'isola madre non sembra avere influito sulla composizione quantitativa e qualitativa dei singoli popolamenti microinsulari. Sono elencate le specie più diffuse nelle isole circumsarde e si accenna alle loro esigenze ecologiche. *Garypus beauvoisi* (Savigny & Audouin, 1826) è citata per la prima volta di Toscana e di Sicilia, *Amblyolpium dollfusi* Simon, 1898 è nuova per la Sicilia e *Rhacochelifer corcyrensis* (Beier, 1930) per la Sardegna.

ABSTRACT

Zoological researches of the oceanographic ship "Minerva" (C. N. R.) on the circumsardinian islands. XXXI. Pseudoscorpiones.

Twenty-seven species of Pseudoscorpions have been found in 44 small islands around Sardinia, i.e. 37,5% of the whole Sardinian population, which consists of 72 species (18 are troglobitic and 28 endemic). Between them, twenty-four species also occur in Sardinia.

A chorological analysis reveals that Mediterranean (Tyrrhenian included) species dominate over the other patterns of distribution: i. e. 14 species are Mediterranean s. l. and Tyrrhenian, 5 endemic, 4 Europeo-Mediterranean, 1 Turano-Mediterranean, 1 Centralasiatic-Mediterranean and 2 with indefinite chorotype. The number of species of each island is not always according to the species/area relationship, and the size of the area is not the only parameter to explain species abundance.

Garypus beauvoisi (Savigny & Audouin, 1826) is firstly recorded from Tuscany and Sicily, *Amblyolpium dollfusi* Simon, 1898 from Sicily and *Rhacochelifer corcyrensis* (Beier, 1930) from Sardinia.

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CATALOGUE OF MELANESIAN RODENTS IN THE
MUSEUM OF GENOVA
(MAMMALIA, RODENTIA)

INTRODUCTION

Rodent specimens from Melanesia (New Guinea and surrounding islands) have been stored at the Museo Civico di Storia Naturale “Giacomo Doria” in Genova since the latter decades of the nineteenth century. The main body of this collection (206 samples) is represented by 152 specimens collected by the Italian explorer and collector Lamberto Loria (1855-1913) during his pioneering biological and anthropological survey efforts between 1889 and 1896 in south-eastern New Guinea (the modern day Milne Bay, Central Provinces and National Capital District of Papua New Guinea). Earlier specimens derive from the collections of the Italian naturalist-explorers Odoardo Beccari (1843-1920), 18 specimens from north-western New Guinea, and Luigi Maria D’Albertis (1841-1901), 34 specimens from the Fly River in south-central and Mount Arfak in the Vogelkop Peninsula of north-western New Guinea (D’ALBERTIS 1880; GESTRO 1928; VAN STEENIS KRUSEMAN 1950; CAPOCACCIA & POGGI 1982). A single specimen was collected by the Dutch collector A. A. Bruijn in 1875 (PETERS & DORIA 1876) on the island of Salawati off north-western New Guinea, and another by the British explorer

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C. M. Woodford in 1889 in the Solomon Islands (WOODFORD 1890).

Though modest with respect to the number of specimens that it holds, the Museum of Genova represents one of the most important collections of New Guinea mammals (PETERS & DORIA 1876, 1881; THOMAS 1897; FLANNERY 1995a). The collection of Melanesian rodents is important both for its scientific and historical value. It contains, for instance, the first specimens of three endemic New Guinean murine genera to be deposited in a museum (*Leptomys* Thomas, 1897, *Paramelomys* Rümmler, 1936 and *Pogonomelomys* Rümmler, 1936); it also houses a good number of type specimens (as identified below) as well as exemplars of several species very rare in collections, such as the large endemic insular murines *Uromys rex* (of Guadalcanal in the Solomon Archipelago) and *Uromys siebersi* (of the Kai Archipelago of Indonesia).

Previous overviews of Melanesian rodent holdings in Genova include the publications of PETERS (1874) and PETERS & DORIA (1876, 1881), who reviewed the Melanesian material gathered by Beccari, D'Albertis and Bruijn (including new species of monotremes, marsupials, rodents and bats), and that of THOMAS (1897), who provided an overview of mammal specimens later obtained by Loria. During the twentieth century, a number of rodent taxonomists discussed particular Melanesian specimens in the collection (RÜMMLER 1938; TATE 1951; DENNIS & MENZIES 1979; TAYLOR *et al.* 1982; MENZIES 1989, 1990, 1996; GROVES & FLANNERY 1994; FLANNERY 1995a) and Genova specimens continue to influence important works in New Guinea murine systematics today (MUSSE & CARLETON 2005; HELGEN 2007; MUSSE *et al.* in press).

The purpose of this catalogue is to bring together in one place a summary of information on these holdings and to bring up to date the identifications of the museum's material according to current taxonomy and nomenclature (e.g. MUSSE & CARLETON 2005).

TYPE SPECIMENS

Amongst the Melanesian rodent holdings at the Museum of Genova are a number of type specimens, including six holotypes, one lectotype, one syntype, paralectotypes for five taxa, and four paratypes (terms used according to INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE 1999). Descriptions of new taxa based on Genova material were published by two sets of authors: Wilhelm

Peters (curator of the Museum of Berlin), both alone and with Giacomo Doria (Director of the Museum of Genova) as co-author, and Michael Rogers Oldfield Thomas of the British Museum (Natural History) in London (BMNH; today the Natural History Museum, London).

For several taxa named by Peters based on material collected by Beccari, D'Albertis, and Bruijn, syntype series were split between the Museum of Genova and the Museum für Naturkunde in Berlin (ZMB). For those named by Oldfield Thomas based on material collected by Loria, for all taxa except *Leptomys elegans*, the unique example of which was retained in Genova, two designated syntypes were in each case automatically divided between London and Genova, an arrangement presumably both convenient to Thomas and deferential to Genova. THOMAS (1897: 607) wrote:

Of each of the new species two "co-types" [i.e. syntypes] have been specially selected for description, one of these being permanently preserved in the Genoa and the other in the British Museum. The remaining members of the series would of course be simple paratypes. *Leptomys elegans* is alone represented by a single example.

For most of these divided syntype series, a lectotype was selected by subsequent revisers, either presumably or explicitly for convenience on the part of future taxonomic workers (RÜMMLER 1938; TATE 1951; TAYLOR *et al.* 1982; MENZIES 1989; MUSSER & CARLETON 2005). In all but a single case (that of *Hydromys beccarii*, see below), the lectotype was selected at BMNH or ZMB rather than at Genova. To the best of our knowledge, only one specimen at Genova remains a syntype - the original "co-type" of *Pogonomys loriae* Thomas, 1897, for which no lectotype has been chosen (the other syntype remains at BMNH; see below).

Finally, we note that other (non-type) mammal specimens secured by Loria have been traded amongst many major European museums (including London, Dresden and Oslo among others), such that the great majority but by no means all of the rodent specimens collected during Loria's efforts are preserved in Genova.

Holotypes

MSNG 32988, holotype of *Leptomys elegans* Thomas, 1897 (Figs 1, 2).

MSNG 3534, holotype of *Mus beccarii* Peters & Doria, 1881 (not *Mus beccarii* Jentink, 1880) and *Mus doriae* Trouessart, 1897 (currently regarded as synonyms of *Rattus rattus* (Linnaeus, 1758); see below).

MSNG 3491, holotype of *Mus mollipilosus* Peters & Doria, 1881 (now classified as *Pogonomys mollipilosus* (Peters & Doria, 1881); see below) (Figs 3, 4).

MSNG 3460, holotype of *Mus ringens* Peters & Doria, 1881 (currently regarded as a synonym of *Rattus leucopus* (Gray, 1867); see below).

MSNG 3677, holotype of *Uromys bruijnii* Peters & Doria, 1876 (now classified as *Pogonomelomys bruijnii* (Peters & Doria, 1876); see below) (Figs 5, 6).

MSNG 3248, holotype of *Uromys validus* Peters & Doria, 1881 (currently regarded as a synonym of *Uromys caudimaculatus* (Krefft, 1867); see below).

Lectotypes

MSNG 3637, lectotype of *Hydromys beccarii* Peters, 1874 (currently regarded as a synonym of *Hydromys chrysogaster* E. Geoffroy, 1804; see below), selected by TATE (1951: 235) (Figs 7, 8).

Syntypes

MSNG 3492, syntype of *Pogonomys loriae* Thomas, 1897 (the other syntype is apparently BMNH 97.8.7.47; see TATE 1951: 280).

Paralectotypes

MSNG 3501, paralectotype of *Mus gestri* Thomas, 1897 (currently regarded as a synonym of *Rattus sordidus* (Gould, 1858); see below); lectotype (BMNH 97.8.7.36) selected by RÜMMLER (1938: 208); see also TAYLOR *et al.* (1982: 269).

MSNG 3495 (b), paralectotype of *Pogonomys lamia* Thomas, 1897 (now classified as *Chiruromys lamia* (Thomas, 1897); see below); lectotype (BMNH 97.8.7.65) selected by RÜMMLER (1938: 73).

MSNG 3600 (a), paralectotype of *Uromys levipes* Thomas, 1897 (now classified as *Paramelomys levipes* (Thomas, 1897); see below); lectotype (BMNH 97.8.7.72) selected by RÜMMLER (1938: 139); see also MENZIES (1989) and MUSSER & CARLETON (2005).



Fig. 1 - MSNG 32988, holotype of *Leptomys elegans* Thomas, 1897; dorsal and ventral view of the skin.



Fig. 2 - MSNG 32988, holotype of *Leptomys elegans* Thomas, 1897; skull.



Fig. 3 - MSNG 3491, holotype of *Mus mollipilosus* Peters & Doria, 1881 (now classified as *Pogonomys mollipilosus* (Peters & Doria, 1881)); dorsal and ventral view of the skin.



Fig. 4 - MSNG 3491, holotype of *Mus mollipilosus* Peters & Doria, 1881 (now classified as *Pogonomys mollipilosus* (Peters & Doria, 1881)); skull; only the left part of the mandible is present.



Fig. 5 - MSNG 3677, holotype of *Uromys bruijnii* Peters & Doria, 1876 (now classified as *Pogonomelomys bruijnii* (Peters & Doria, 1876)); dorsal and ventral view of the skin.



Fig. 6 - MSNG 3677, holotype of *Uromys bruijnii* Peters & Doria, 1876 (now classified as *Pogonomelomys bruijnii* (Peters & Doria, 1876)); skull.

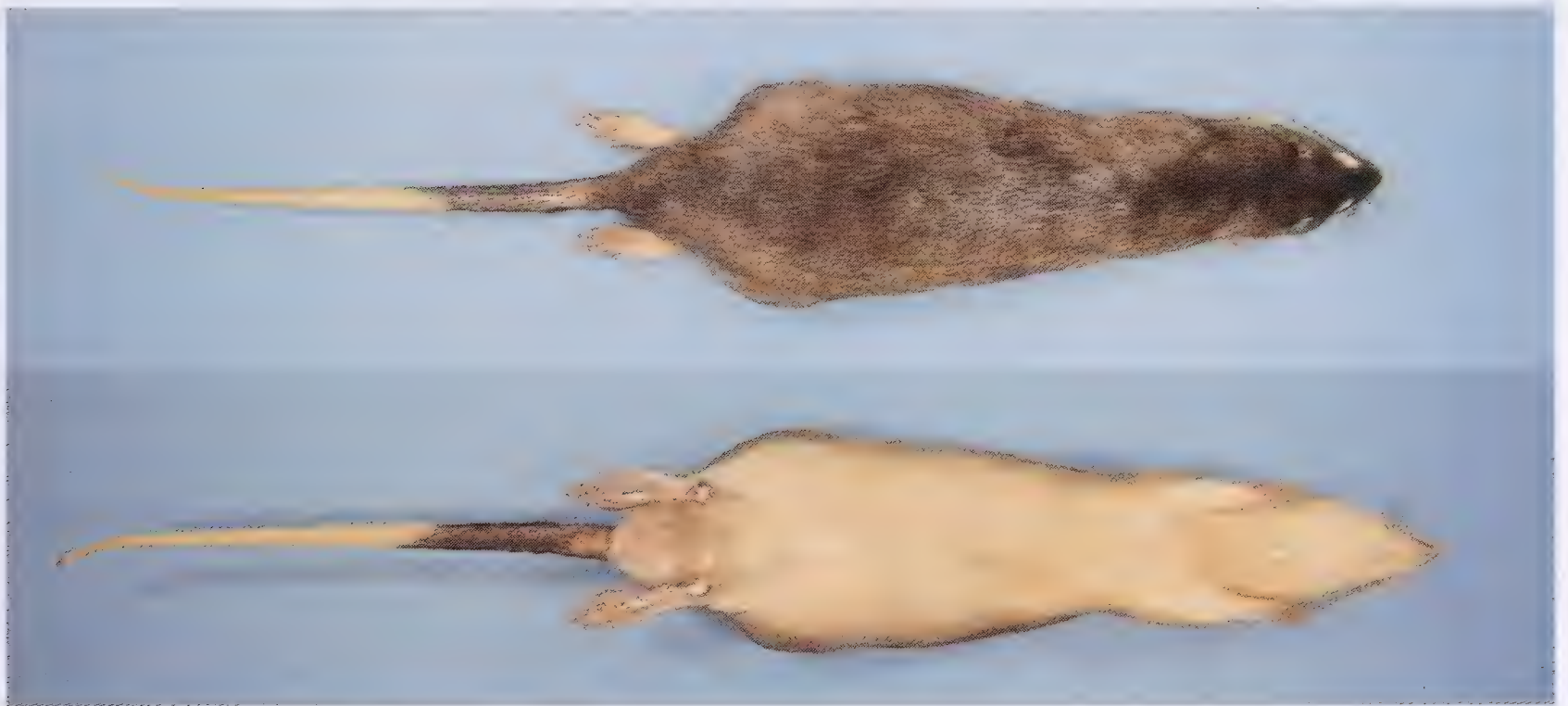


Fig. 7 - MSNG 3637, lectotype of *Hydromys beccarii* Peters, 1874 (currently regarded as a synonym of *Hydromys chrysogaster* E. Geoffroy, 1804); dorsal and ventral view of the skin.



Fig. 8 - MSNG 3637, lectotype of *Hydromys beccarii* Peters, 1874 (currently regarded as a synonym of *Hydromys chrysogaster* E. Geoffroy, 1804); skull.

MSNG 3474 (a-d), four paralectotypes of *Mus albertisi* Peters & Doria, 1881 (currently regarded as a synonym of *Mus musculus* Linnaeus, 1758; see below); lectotype (ZMB 5423) selected by RÜMLER (1938: 218).

MSNG 3257-57, paralectotype of *Pogonomys lepidus* Thomas, 1897 (currently regarded as a synonym of *Pogonomys macrourus* (Milne-Edwards, 1877); see below), lectotype (BMNH 97.8.7.51) selected by TATE (1951: 279).

GAZETTEER

To maximize the usefulness of our catalogue, we have compiled a gazetteer of collecting localities mentioned in the pages below (Fig. 9). Some localities, such as Port Moresby and Yule Island in southeastern Papua New Guinea, and Humboldt Bay (near Jayapura), Salawati, and Sorong in West Papua refer to well known historical place names in the region and need no detailed explanation to students of the region. Other place names refer to lesser known vil-

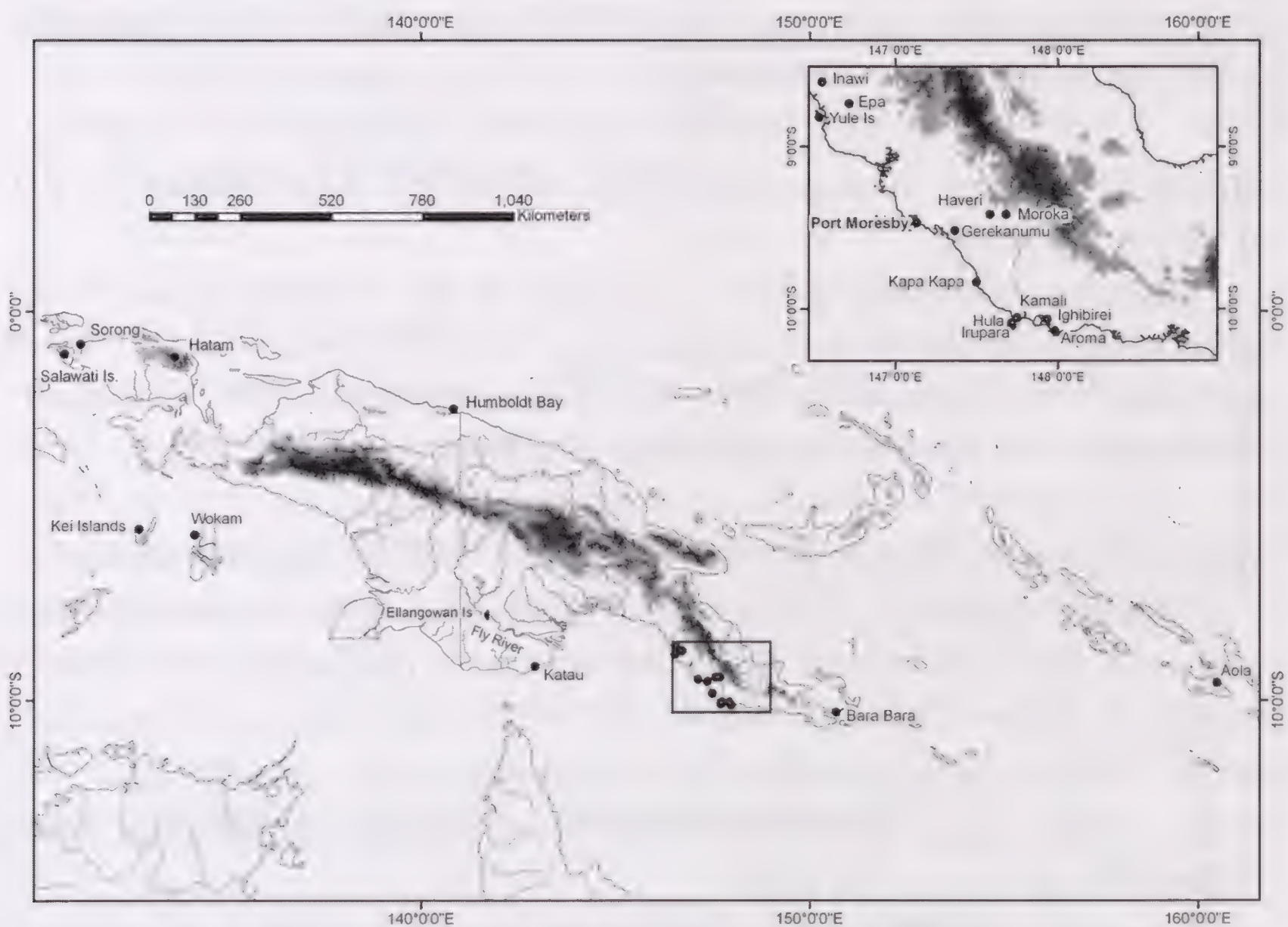


Fig. 9 - Map of collecting localities.

lages or collecting camps, and our understanding of the situation of these localities is clarified and briefly discussed. For locality details we have depended especially on information provided by THOMAS (1897), TATE (1951), LAURIE & HILL (1954), TAYLOR *et al.* (1982) and BONACCORSO (1998).

INDONESIA

Maluku Province: Weri, Kai Bandan (Kai Besar), Kai Islands

(Beccari collecting locality) The Kai (or Kei) Islands are an oceanic archipelago in the south-eastern Moluccas, lying just off the bathymetric contours of the Australo-Papuan continental shelf, near the Aru Islands. We have been unable to locate this specific locality (Weri) within the archipelago. BECCARI (1924: 239-241) wrote that "Keibandan" is a village lying in a bay placed almost in the middle of the western coast of the Great Kei (the island of Kai Besar) and that, on August 1st [1873], he reached a place [probably Weri] with a forest at about 7-8 miles from Keibandan by a ship; he spent there some days and, on August 9th, he received a "Kedir", a rodent living underground in small holes [probably *Hydromys beccarii*], by indigenous collectors.

Maluku Province: Wokam (05°44'S, 134°11'E), Aru Islands, < 250 m above sea level

(Beccari collecting locality) Wokam is the northernmost of the large islands in the Aru Archipelago, a land-bridge group of islands between New Guinea and the Australian continent. The islands are low-lying, with maximum elevation less than 250 m above sea level.

Papua Province: Humboldt Bay (02°30'S, 140°50'E), near sea level

(Beccari collecting locality) Humboldt Bay is the harbour associated with the port city of Jayapura, formerly Hollandia, the modern capital of Papua Province.

West Irian Jaya Province: Hatam (01°14'S, 134°01'E), *circa* 1000-1500 m above sea level

(Beccari and D'Albertis collecting locality) Hatam is a village on Mt. Arfak in the Arfak Mountains of the Vogelkop ("Bird's

Head") Peninsula of northwestern New Guinea. According to WALLACE (1880), Hatam is "a village on Mount Arfak, about 3500 feet above the sea". D'ALBERTIS (1879) referred to the locality as "Mt. Hatam" and gave the maximum elevation of the mountain as 5000 feet. TAYLOR *et al.* (1982: 327) gave the elevation of Hatam as "1200 m" and its coordinates as "01°10'S, 133°40'E".

West Irian Jaya Province: Salawati Island (01°05'S, 130°53'E), < 700 m above sea level

(Bruijn collecting locality) Salawati (= Salawatti or Salwatti) is a medium sized (*circa* 1600 km²), low-lying (0-700 m) land-bridge island in the Raja Ampat group off the northwestern tip of the Vogelkop Peninsula (see D'ALBERTIS 1879).

West Irian Jaya Province: Sorong (00°53'S, 131°15'E), near sea level

(Beccari and D'Albertis collecting locality) The town of Sorong is located on the north-western coast of the Vogelkop Peninsula (see D'ALBERTIS 1879). This locality, often named or labelled "Sorong Island" in older literature or on older specimens, may refer either to the town of Sorong itself or to Pulau Doom, a small island off the coast of Sorong which was an important historical centre of trading in the region (T. Flannery, *in litt.*).

PAPUA NEW GUINEA

Central Province: Aroma (10°08'S, 147°59'E), near sea level

(Loria collecting locality) "... Aroma, still further east (10.8 S. 147.59 E.) [of Kapa Kapa and Cape Hood]" (THOMAS 1897: 607). LAURIE & HILL (1954: 140) gave the same coordinates of the modern settlement of Aroma (= Aroma Coast) (10°08'S, 147°59'E).

Central Province: Epa (08°44'S, 146°43'E)

(D'Albertis collecting locality) LAURIE & HILL (1954: 144) gave the coordinates of Epa as "08°44'S, 146°43'E."

Central District: Gerekanumu (09°31'S, 147°22'E), *circa* 0-200 m above sea level

(Loria collecting locality) "Gerekanumu, on the southern slope of the Astrolabe Range (09.31 S. 147.22 E.)" (THOMAS 1897: 607). LAURIE & HILL (1954: 145) and TAYLOR *et al.* (1982: 322) quoted the same coordinates for this locality (as "Gerekanamu"). TAYLOR *et al.* (1982: 322) gave the elevation at Gerekanamu as "200 m." The modern settlement of Gereka is situated at 09°30'S, 147°17'E, near sea level.

Central Province: Haveri (09°25'S 147°35'E), *circa* 700 m above sea level

(Loria collecting locality) "Haveri (09.25 S. 147.35 E.) ... among the mountains behind the Astrolabe Range, near Mt. Wori-Wori" (THOMAS 1897: 607). TAYLOR *et al.* (1982: 321) provided these same coordinates, but LAURIE & HILL (1954: 145) and later BONACCORSO (1998: 431) associated this collecting locality with the coordinates "09°25'S, 147°22'E". TAYLOR *et al.* (1982: 321) gave the elevation of Haveri as "750 m", though most of Loria's specimen labels quote the elevation as "700 m". Tags on the Genova specimens identify this locality with the "Bartholomew Range". "Mt. Wori-Wori" is today referenced as "Vori Vori Bluff" (A. ALLISON, *in litt.*).

Central Province: Hula (10°06'S, 147°43'E), near sea level

(Loria collecting locality) "Hula, close to the mouth of the [Kemp Welch] river on the promontory that ends in Cape Hood (10.10 S. 147.44 E)" (THOMAS 1897: 607). Some specimen labels give this locality as "Hula, Hood Point". The modern settlement of Hula is situated at 10°06'S, 147°43'E.

Central Province: Ighibirei (09°43'S, 147°45'E), elevation unknown

(Loria collecting locality) "Ighibirei, on the Kemp Welch river some little way inland" (THOMAS 1897: 607); "just inland from the mouth of the Wanigela River" (LAURIE & HILL 1954: 146). PUTHZ (1971: 453) at first was unable to locate this locality, but later identified it as Boku (09°43'S, 147°45'E) on the basis of a handmade map (PUTHZ 1982: 121). BONACCORSO (1998: 431) gave the coordinates of "Ighibierei" as "10°02'S, 147°46'E". Only *Chiruromys lamia* (Thomas, 1897), a mouse only known from montane forests (recorded altitudes from 1200-2300 m; FLANNERY 1995a) is represented amongst Loria's collections from Ighibirei at Genova—an

indication that this collection site was probably situated within this same altitudinal range.

Central Province: Inawi (08°36'S, 146°33'E), near sea level

(Loria collecting locality) "Inawi, on the S. Giuseppe river, which runs into Hall Sound" (THOMAS 1897: 607). LAURIE & HILL (1954: 140) gave the coordinates for "Inawi" (= Inawa) as "08°31'S, 146°35'E". The modern settlement of Inawi (also spelled Inawae) is situated at 08°36'S, 146°33'E.

Central Province: Irupara (10°05'S, 147°43'E), near sea level

(Loria collecting locality) "... Irupara ... close to the mouth of the [Kemp Welch] river on the promontory that ends in Cape Hood (10.10 S. 147.44 E)" (THOMAS 1897: 607); "near Kamali" (LAURIE & HILL 1954: 146). The modern settlement of Irupara is situated at 10°05'S, 147°43'E.

Central Province: Kamali (10°03'S, 147°45'E), near sea level

(Loria collecting locality) "Kamali ... close to the mouth of the [Kemp Welch] river on the promontory that ends in Cape Hood (10.10 S. 147.44 E)" (THOMAS 1897: 607). BONACCORSO (1998: 432) gave the same coordinates quoted for Cape Hood (i.e. 10°10'S, 147°44'E) as the position of Kamali. Some specimen labels give this locality as "Hood Bay, Kamali". LAURIE & HILL (1954: 147) gave the coordinates of Kamali as "10°02'S, 147°45'E", and the modern settlement of Kamali is situated at 10°03'S, 147°45'E.

Central Province: Kapa Kapa (09°50'S, 147°30'E), near sea level

(Loria collecting locality) "Kapa Kapa (9.50 S. 147.30 E.) ... a little further east [of Cape Hood] ... on the sea coast" (THOMAS 1897: 607); at the "mouth of the Kemp Welch River" (TATE 1951: 420). LAURIE & HILL (1954: 147) quoted these same coordinates for Kapa Kapa (i.e. 09°50'S, 147°30'E). BONACCORSO (1998: 432) gave the coordinates for Kapa Kapa as "09°48'S, 147°30'E".

Central Province: Moroka (09°25'S, 147°41'E), *circa* 1300 m above sea level

(Loria collecting locality) "Moroka (09.25 S. 147.41 E.), among the mountains behind the Astrolabe Range, near Mt. Wori-Wori"

(THOMAS 1897: 607); at the "headwaters of the Musgrave River" (TATE 1940: 2). LAURIE & HILL (1954: 151) gave the coordinates of this locality as "09°24'S, 147°32'E". Loria's specimen labels quote the elevation of Moroka as "1300 m.". Tags on the Genova specimens identify this locality with the "Bartholomew Range". "Mt. Wori-Wori" is today referenced as "Vori Vori Bluff" (A. ALLISON, *in litt.*).

Central Province: Yule Island (08°49'S, 146°32'E), near sea level

(D'Albertis collecting locality) Yule is a small, low-lying land bridge island near the modern settlement of Poukama. Between Yule and the mainland is Hall Sound, long an important harbour in Papua New Guinea.

Milne Bay Province: Bara Bara (10°19'S, 150°41'E), near sea level

(Loria collecting locality) "... one locality, Bara Bara, is opposite Killerton Island in Milne Bay at the extreme S.E. corner of New Guinea" (THOMAS 1897: 607). BONACCORSO (1998: 428) gave the coordinates for this locality (erroneously, in our assessment) as 09°07'S, 149°19'E. LAURIE & HILL (1954: 140) gave coordinates for the "Bara Bara River" on mainland New Guinea as 10°19'S, 150°41'E, and Killerton Island is located at 10°21'S, 150°40'E. The modern settlement of Barabara is now located on Normanby Island in the D'Entrecasteaux Archipelago and is situated at 10°08'S, 151°07'E. As a result, McDOWELL (1975) erroneously associated this collecting locality with Normanby Island.

National Capital District: Port Moresby (09°28'S, 147°08'E)

Port Moresby is the capital and largest city in the nation of Papua New Guinea.

Two specimens are labelled "Port Moresby, D'Albertis" but L. M. D'Albertis never visited this locality; these specimens were instead probably collected by L. Loria.

Western Province: Fly River (southwestern region)

(D'Albertis collecting locality) D'Albertis made three expeditions up the Fly River in 1875, 1876 and 1877, and collected extensively along the river (particularly birds and plants), although

exact localities are unclear. On his first journey he reached as far as Ellangowan Island (7°49'S 141°41'E). On his second expedition up the Fly River he claimed to have reached 05°30'S before being forced back by low waters and lack of supplies, but Sir William MacGregor who later explored the Fly, doubted that he had passed 06°11'S (GIBBNEY 1972). His final expedition was beset with problems, and he did not reach as far as he had on his second expedition.

Western Province: Katau (09°00'S, 143°00'E)

(D'Albertis collecting locality) Katau lies in the south-eastern TransFly area to the west of the Fly River, and D'Albertis visited this locality on each of his three expeditions up the Fly River: "at anchor here in the little river Kataw, in sight of the houses of Moatta (= Mawatta), which are 800 or 1000 yards from us" (D'ALBERTIS 1880: 162). He had an extended stay there (August 7th to November 2nd 1876) due to bad weather on his second expedition and in this period probably the majority of his specimens were collected. He also purchased animals from people from surrounding villages, including the village of Matzingare. This river is also known as the Binaturi River (LOVERIDGE 1948).

SOLOMON ISLANDS

Guadalcanal Province: "Guadalcanar" (= Guadalcanal), altitude unknown

(Woodford collecting locality) One specimen of *Uromys rex* at Genova was collected in Guadalcanal by Woodford; the specimen is labelled "Guadalcanar" which is the archaic name of Guadalcanal. Other native murids collected by Woodford on Guadalcanal were all taken at Aola (09°32'S, 160°29'E), on the north-eastern coast of the island (THOMAS 1888).

FORMAT

The species are listed in alphabetical order according to genus and species. For each record we give the following information:

Catalogue number of the Museum of Genova (MSNG); for

numerous series the number is followed by a letter, a number or a roman number in brackets, or a number after a line. In some cases, specimens from other museums are discussed, under the following museum abbreviations: BMNH (Natural History Museum, London); ZMB (Museum für Naturkunde, Humboldt Universität, Berlin).

Locality of collection: country, province, and geographical locality and, when clearly indicated on the original label, altitude above sea level. Refer to the gazetteer (above) for further details on some collection localities.

Details of collection: the collecting date is given in arabic numerals (day), roman numerals (month) and arabic numerals (year), for instance "3.VI.1873". The collector is indicated with the first letter of the first (Christian) name (and sometimes of the middle name) and the entire surname, e.g. "L. Loria" or "L. M. D'Albertis".

Nature of specimen: number of specimens, sex and stage of development are given: ♂ = male, ♀ = female, juv. = young. Type specimens have been identified above and in the accounts that follow. Specimens are preserved as one of the following preparations: skin; skull; skin and skull; or alcohol (preserved in ethanol); for some specimens preserved in alcohol the skull has been prepared to better identify the species. We note that many of the skins in the collection were prepared in 1937 from carcasses stored in fluid, long after their date of collection.

Order **RODENTIA** Bowdich, 1821

Family **MURIDAE** Illiger, 1811

Subfamily **MURINAE** Illiger, 1811

Chiruromys forbesi Thomas, 1888

MSNG 3258 (a-c). Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 1 ♂ (b), 1 ♂ juv. (a), 1 ♀ (c), skin and skull.

MSNG 3521. Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 1 ♂ juv., skin and skull.

MSNG 3521 (a-d). Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 2 ♂♂ (b and d), 2 ♀♀ (a and c), skin and skull.

MSNG 52759. Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 1 ♀, alcohol and skull.

Remarks. The type series of *Pogonomys forbesi vulturinus* Thomas, 1920 (a synonym of *Chiruromys forbesi*) are specimens from this same series, collected by Loria at Bara Bara in 1890, but sent to Oldfield Thomas in London (see THOMAS 1920).

Chiruromys lamia (Thomas, 1897)

MSNG 3495 (a). Papua New Guinea, Central Province, Ighibirei, 1890, L. Loria; 1 ♂, skin and skull, paratype of *Pogonomys lamia* Thomas, 1897.

MSNG 3495 (b). Papua New Guinea, Central Province, Ighibirei, 1890, L. Loria; 1 ♀, skin and skull, paralectotype of *Pogonomys lamia* Thomas, 1897.

Remarks. THOMAS (1897) originally described this species based on seven specimens collected by Loria from Ighibirei (designated as the type locality) and Haveri. Of the five specimens from Ighibirei, Thomas identified two as "cotypes" (= syntypes—apparently the specimens now designated as BMNH 97.8.7.65 and MSNG 3495 (b)). We accept RÜMMLER'S (1938: 73) reference to the BMNH specimen as "the type" (i.e. "der Typus") as a lectotype designation for *lamia*. MSNG 3495 (b) is thus a paralectotype.

Chiruromys vates (Thomas, 1908)

MSNG 54203. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♀, skin and skull, paratype of *Pogonomys lamia* Thomas, 1897. Ex MSNG 3495 (a).

Remarks. This specimen formed part of Thomas' original hypodigm of *Chiruromys lamia* (see THOMAS 1897). However, we now

identify it instead as *Chiruromys vates* (Thomas, 1908), on account of its richer coloration, smaller molars, shorter incisive foramina, and less expanded zygomata relative to the type (and other) specimens of *C. lamia* (cf. THOMAS 1908). Further, *C. lamia* is a montane mouse (firmly identified specimens are known only from elevations at and above 1200 m; FLANNERY 1995a), while *C. vates* is widely distributed in the lowlands of southern and southeastern New Guinea (sea level to 1500 m; FLANNERY 1995a). Haveri, the site where this specimen is collected, is apparently situated at approximately 700 m above sea level (see Gazetteer, above). Unfortunately, the first and second authors made only cursory examination of this specimen when visiting Genova, so we recommend that this identification be revisited by future examiners.

Hydromys chrysogaster E. Geoffroy, 1804

MSNG 3637. Indonesia, Maluku Province, Kai Islands, Kai Bandan, Weri, without collecting date, O. Beccari; 1 ♂, skin and skull, lectotype of *Hydromys beccarii* Peters, 1874. TATE (1951) gave erroneously the number 3627 for this specimen (Figs 7, 8).

MSNG 3663. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♀ juv., skin and skull.

R e m a r k s . PETERS (1874) based his description of *Hydromys beccarii* on two syntypes, one deposited in Genova (MSNG 3637), the other in Berlin (ZMB 4805). TATE (1951: 191) acknowledged the two syntypes before referring to the Genova specimen as the “type” of *beccarii* (p. 235; though he gave the number as MSNG 3627), and we accept this as a lectotype designation.

Though *Hydromys beccarii* Peters, 1874 is usually regarded as a synonym of the large and widespread species *Hydromys chrysogaster*, patterns of geographic variation in *H. chrysogaster* remain little studied (TATE 1951; HELGEN 2005), and as currently recognized, this widespread species is likely to represent a complex of related species. As the oldest name applied to a Melanesian population of *Hydromys*, further study may show that the epithet *beccarii* is the most appropriate name for a distinct species endemic to the Melanesian region.

Leptomys elegans Thomas, 1897

MSNG 32988. Papua New Guinea, Central Province, Astrolabe Range, without collecting date, L. Loria; 1 ♀, skin and skull, holotype of *Leptomys elegans* Thomas, 1897 (Figs 1, 2).

R e m a r k s . MUSSER *et al.* (in press) provided a comprehensive overview of the taxonomy and biology of the genus *Leptomys*, the type species of which is *L. elegans*. The original details of collection for the holotype of *elegans* are not recorded. According to MUSSER *et al.* (in press):

The tag of the holotype bears no definite locality other than "British N.G.", and no exact provenance was published in the original description of *L. elegans*, although Thomas (1897: 607) wrote that Loria's localities "are mostly between the Owen Stanley Range and the sea, in or near the watershed of the Kemp Welch river", an area that would include the Astrolabe Range and adjacent Sogeri Plateau. TATE (1951: 223) observed that "Loria collected in the Astrolabe Range behind Port Moresby", and we regard specimens from the Astrolabe Range (available at AMNH and ZMB) as topotypical.

Melomys leucogaster (Jentink, 1908)

MSNG 3609 (a and b). Papua New Guinea, Central Province, Hood Bay, Kamali, III.1891, L. Loria; 1 ♂ (b), 1 ♀ (a), skin and skull.

MSNG 3616. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂, skin and skull.

MSNG 54204. Papua New Guinea, Central Province, Yule Island, IV.1875, L. M. D'Albertis; 1 ♀, skin and skull. Ex MSNG 3200 (2).

MSNG 54207. Papua New Guinea, Central Province, Yule Island, 1875, L. M. D'Albertis; 1 ♂, skin and skull. Ex MSNG 3240-17.

Melomys lutillus (Thomas, 1913)

MSNG 3601. Papua New Guinea, Central Province, Astrolabe Range, Gerekanumu, II.1893, L. Loria; 1 ♂ juv., skin and skull.

MSNG 43956. Papua New Guinea, without collecting date, L. M. D'Albertis; 1 specimen, alcohol.

MSNG 54206 (a and b). Papua New Guinea, Central Province, Epa, IV.1875, L. M. D'Albertis; 1 ♂ (a) ex MSNG 3240-14, 1 ♀ (b) ex MSNG 3240-16, skin and skull.

MSNG 54212. Papua New Guinea, National Capital District, Port Moresby, without collecting date, [L. M. D'Albertis in the label but probably L. Loria; see Gazetteer, above]; 1 ♂, skin and skull. Ex MSNG 3507 (1).

Melomys rufescens (Alston, 1877)

MSNG 3240- (13, 15 and 18). Papua New Guinea, Western Province, Fly River, 1875, L. M. D'Albertis; 2 ♂♂ (13 and 18), 1 ♀ (15), skin and skull.

MSNG 3507 (2). Papua New Guinea, National Capital District, Port Moresby, without collecting date, [L. M. D'Albertis in the label but probably L. Loria; see Gazetteer, above]; 1 ♂, skin and skull.

MSNG 42139 (I and II). Papua New Guinea, Western Province, Fly River, 1875, L. M. D'Albertis; 1 ♀ (I), 1 juv. (II), alcohol and skull.

MSNG 42139 (III and IV). Papua New Guinea, Central Province, Epa, 1875, L. M. D'Albertis; 2 juv., alcohol and skull.

MSNG 42139 (V). Papua New Guinea, without collecting date, L. M. D'Albertis; 1 juv., alcohol and skull.

MSNG 54202. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂ juv., skin and skull. Ex MSNG 3669.

MSNG 54205. Indonesia, West Irian Jaya Province, Mount Arfak, Hatam, 1875, L. M. D'Albertis; 1 ♀, skin and skull. Ex MSNG 3240-12.

MSNG 54209 (a and b). Papua New Guinea, Central Province, Kapa Kapa, VII.1889, L. Loria; 1 ♂ (b), 1 ♀ (a), skin and skull. Ex MSNG 3256.

MSNG 54214. Papua New Guinea, Central Province, Bartholomew

Range, Haveri, VIII-XI.1893, L. Loria; 1 ♀, skin and skull. Ex MSNG 3616 (2).

Mus musculus Linnaeus, 1758

MSNG 3474 (a-d). Indonesia, West Irian Jaya Province, Sorong, without collecting date, L. M. D'Albertis; 1 ♂ juv. (d), 2 ♀♀ (a and b), 1 ♀ juv. (d), skin and skull, paralectotypes of *Mus albertisi* Peters & Doria, 1881.

MSNG 3669. Papua New Guinea, without collecting date, L. Loria; 1 ♀, skin and skull.

R e m a r k s . Peters & Doria's (1881) name *Mus albertisi* is a synonym of *Mus musculus* Linnaeus, 1758; the name was applied to a series of commensal house mice collected by D'Albertis at Sorong, including four of the specimens listed above. RÜMMLER (1938: 218) identified a syntype in Berlin (ZMB 5423) as the "type" of *albertisi*, which we accept as a lectotype designation. The four former syntypes MSNG 3474 (a-d) are thus paralectotypes.

Paramelomys levipes (Thomas, 1897)

MSNG 3600 (a). Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 1 ♂, skin and skull, paralectotype of *Uromys levipes* Thomas, 1897.

MSNG 3600 (b). Papua New Guinea, Central Province, Astrolabe Range, Gerekanumu, II.1893, L. Loria; 1 ♂, skin and skull, paratype of *Uromys levipes* Thomas, 1897.

R e m a r k s . THOMAS' (1897) description of *Uromys levipes* was based on these two "co-types" (= syntypes) collected by Loria at Haveri, apparently BMNH 97.8.7.72 (received by London from Genova) and MSNG 3600 (a). MENZIES (1989) formally designated BMNH 97.8.7.72 as the lectotype of *levipes*, but we judge that RÜMMLER (1938) had already fixed a lectotype by his indication that Thomas'

BMNH syntype should be considered “the type” (see also MUSSER & CARLETON 2005: 1432). MSNG 3600 (a) is thus a paralectotype.

Paramelomys lorentzii (Jentink, 1908)

MSNG 3200 (1). Papua New Guinea, Western Province, Fly River, IV.1875, L. M. D’Albertis; 1 ♂, skin and skull.

Pogonomelomys bruijnii (Peters & Doria, 1876)

MSNG 3677. Indonesia, West Irian Jaya Province, Salawati Island, 1875, A. A. Bruijn; 1 ♂, skin and skull, holotype of *Uromys bruijnii* Peters & Doria, 1876 (Figs 5, 6).

Remarks. Two species are now recognized within the genus *Pogonomelomys* (MUSSER & CARLETON 2005), but the true diversity represented among museum collections is much greater (HELGEN & APLIN, *in litt.*). The holotype of *Pogonomelomys bruijnii* from Salawati remains morphologically unique. FLANNERY (1995a: 312) referred a series of *Pogonomelomys* specimens collected on the mainland of the Vogelkop Peninsula (from the localities Djitman and Aijinjo, deposited in the Naturalis Museum, Leiden) to *bruijnii*. This may be a correct attribution, but we note that these specimens are considerably smaller than the holotype of *bruijnii* in cranial and dental size (e.g. crown length of molar row 8.1 mm in the holotype *versus* 6.9–7.3 mm in the series of three adults from the Vogelkop). Only subfossil material from the Vogelkop Peninsula reported by APLIN *et al.* (1999: 379) matches the holotype of *bruijnii* in size; the Leiden series better corresponds to a taxon that APLIN *et al.* (1999: 379–380) identify as “*Pogonomelomys* sp.” A full review of the genus based on all available specimens, modern and subfossil, is needed.

Pogonomys loriae Thomas, 1897

MSNG 3259. Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII–XI.1893, L. Loria; 1 ♀, skin and skull.

MSNG 3492. Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 1 ♀, skin and skull, syntype of *Pogonomys loriae* Thomas, 1897.

MSNG 3492 (a and b). Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 1 ♂ (a) paratype, 1 ♂ juv. (b), skin and skull.

MSNG 3493 (a). Papua New Guinea, Central Province, Astrolabe Range, Gerekanumu, II.1893, L. Loria; 1 ♀, skin and skull.

MSNG 34292. Papua New Guinea, Central Province, Bartholomew Range, Moroka, 1300 m above sea level, VII-VIII.1893, L. Loria; 1 ♀, skin and skull.

MSNG 54210. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂, skin and skull. Ex MSNG 3257-66.

R e m a r k s . THOMAS' (1897) two original "co-types" of *Pogonomys loriae* are apparently MSNG 3492 and BMNH 97.8.7.47 (see TATE 1951: 280). As far as we are aware, no lectotype has been designated.

Pogonomys macrourus (Milne-Edwards, 1877)

MSNG 3257- (50-71; except 66, see *Pogonomys loriae* MSNG 54210). Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂ (57) paralectotype of *Pogonomys lepidus* Thomas, 1897, 13 ♂♂ (51, 56, 59, 60, 61, 62, 63, 64, 67, 68, 69, 70 and 71), 7 ♀♀ (50, 52, 53, 54, 55, 58 and 65), skin and skull.

MSNG 3670. Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 1 ♀ juv., skin and skull.

MSNG 34293-2. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂, skin and skull.

MSNG 34294-1. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂, skin and skull.

MSNG 34295 (a-c). Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 3 ♀♀, skin and skull.

MSNG 34296. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♀ juv., skin and skull.

MSNG 42217 (I-IV). Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 2 ♂♂ (I and II), 2 ♀♀ (III and IV), alcohol and skull.

MSNG 54211. Papua New Guinea, Central Province, Astrolabe Range, Gerekanumu, II.1893, L. Loria; 1 ♀, skin and skull. Ex MSNG 3493 (b).

R e m a r k s . THOMAS (1897) based his description of *Pogonomys lepidus* on two syntypes, apparently MSNG 3257-57 and BMNH 97.8.7.51. We accept TATE'S (1951: 279) reference to the BMNH specimen as the "type" of *lepidus* as a lectotype designation. MSNG 3257-57 is thus a paralectotype.

Pogonomys mollipilosus (Peters & Doria, 1881)

MSNG 3491. Papua New Guinea, Western Province, Katau, without collecting date, L. M. D'Albertis; 1 ♂, skin and skull, holotype of *Mus mollipilosus* Peters & Doria, 1881 (Figs 3, 4).

R e m a r k s . Few specimens of *Pogonomys* have been collected in the TransFly region of southern New Guinea, and the taxonomic status of *Pogonomys mollipilosus* has never been satisfactorily resolved. DENNIS & MENZIES (1979: 322) observed that "the possibility that *mollipilosus* is an Australian species occurring in New Guinea only in the lower Fly River region cannot be ignored", and Australian samples of *Pogonomys* have been explicitly discussed under the name *Pogonomys mollipilosus* (WINTER & WHITFORD 1995), thus assumed to represent a distinct species occurring in Australia and the TransFly. MUSSER & CARLETON (1993, 2005) believed that the holotype of *mollipilosus* to be a specimen of the widespread lowland New Guinea taxon *Pogonomys macrourus* and synonymized it accordingly, but the last revisionary treatment of *Pogonomys* that involved firsthand com-

parisons of the holotype of *mollipilosus* was the review published by DENNIS & MENZIES (1979).

Our own examination of the young holotype (HELGEN 2007: 747) indicates that it is a larger-toothed rat compared to samples of *P. macrourus*, probably does not belong within the synonymy of that taxon as currently recognized (MUSSEY & CARLETON 2005), and possibly shows a closer morphological resemblance to the larger-bodied species *P. loriae*. Taxonomic boundaries within the genus *Pogonomys* remain very poorly understood and must be evaluated in the context of morphometric and genetic examinations of a sufficient sample drawing from type material and the very large number of specimens and sampling localities now represented in world museums.

Rattus exulans (Peale, 1848)

MSNG 3151. Papua New Guinea, Central Province, Kapa Kapa, VII.1891, L. Loria; 1 ♂ and 1 ♀, skin and skull.

MSNG 3167. Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 2 ♀♀, skin and skull.

MSNG 3249- (6-11). Indonesia, Papua Province, Humboldt Bay, XII.1875, O. Beccari; 3 ♂♂ (7, 9 and 11), 3 ♀♀ (6, 8 and 10), skin and skull.

MSNG 3250 (a-d). Indonesia, West Irian Jaya Province, Mount Arfak, Hatam, VI.1875, O. Beccari; 1 ♂ (c), 3 ♀♀ (a, b and d), skin and skull.

MSNG 3255. Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 17 juv., alcohol.

MSNG 3255- (20-49; except 22, 28, 29). Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 13 ♂♂ (21, 23, 24, 25, 27, 34, 35, 38, 44, 46, 47, 48 and 49), 14 ♀♀ (20, 26, 30, 31, 32, 33, 36, 37, 39, 40, 41, 42, 43, 45), skin and skull.

MSNG 3255- (001-008). Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 5 ♂♂ (001, 002, 005, 006 and 007), 3 ♀♀ (003, 004 and 008), skin and skull.

MSNG 3256 (c and d). Papua New Guinea, Central Province, Kapa Kapa, VII.1891, L. Loria; 1 ♂ (d), 1 ♀ (c), skin and skull.

MSNG 3505. Papua New Guinea, Central Province, Mekeo District, Inawi, IX.1892, L. Loria; 1 ♂, skin and skull.

MSNG 3508. Papua New Guinea, Central Province, Hula, Hood Point, VIII.1889, L. Loria; 1 ♀, skin and skull.

MSNG 3509. Papua New Guinea, Central Province, Irupara, VIII.1890, L. Loria; 1 ♂, skin and skull.

MSNG 3518 (a-e). Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 1 ♂ juv. (d), 4 ♀♀ (a, b, c and e), skin and skull.

MSNG 5043. Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 1 ♀, skull.

MSNG 38829 (a-d). Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 1 ♂ (a), 1 ♀ (b), 2 specimens (c and d), skin and skull.

MSNG 52753. Papua New Guinea, Milne Bay Province, Bara Bara, I-II.1890, L. Loria; 1 ♂, alcohol and skull.

MSNG 52755. Papua New Guinea, Central Province, Bartholomew Range, Haveri, XI.1893, L. Loria; 1 ♀, alcohol and skull.

Rattus leucopus (Gray, 1867)

MSNG 3219. Papua New Guinea, Western Province, Katau, without collecting date, L. M. D'Albertis; 1 ♂ juv., skin and skull.

MSNG 3244 (a-e). Indonesia, Maluku Province, Aru Islands, Wokam, 29.II-3.VI.1873, O. Beccari; 2 ♂♂ (b and c), 2 ♀♀ (a and d), skin and skull; 1 juv. (e), alcohol.

MSNG 3460. Papua New Guinea, Western Province, Fly River, without collecting date, L. M. D'Albertis; 1 ♀, skin and skull, holotype of *Mus ringens* Peters & Doria, 1881.

MSNG 3506. Papua New Guinea, Central Province, Astrolabe Range, Gerekanumu, II.1893, L. Loria; 1 ♂, skin and skull.

MSNG 52752. Papua New Guinea, Central Province, Kapa Kapa, VI-VII.1891, L. Loria; 1 ♂ juv., alcohol and skull.

MSNG 54201. Papua New Guinea, Western Province, Katau, without collecting date, L. M. D'Albertis; 3 juv., alcohol. Ex MSNG 3219.

MSNG 54208. Papua New Guinea, Fly River, 1875, L. M. D'Albertis; 1 ♂ juv., skin and skull. Ex MSNG 3240-19.

R e m a r k s . As far as we are aware, FLANNERY (1995b) provided the first published record of a native *Rattus* species in the Aru Islands when he reported *R. leucopus* from Aru based on two specimens deposited at the Australian Museum in Sydney. Flannery and earlier reviewers, such as TAYLOR *et al.* (1982), apparently overlooked Beccari's series of *Rattus* from the Aru Islands in Genova, which we refer to *Rattus leucopus*.

According to FLANNERY (1995b), the Aru specimens referred to *R. leucopus* in the Australian Museum have four pairs of mammae, but *Rattus leucopus* from mainland New Guinea and Australia have only three pairs (TAYLOR *et al.* 1982; TAYLOR & HORNER 1973), as does the only one of the Genova Aru specimens in which the formula can be determined, MSNG 3244 (d). Aru specimens (both in Sydney and Genova) warrant further examination to establish their taxonomic status relative to other populations identified as *R. leucopus* (MUSSEY & CARLETON 2005).

Rattus mordax (Thomas, 1904)

MSNG 3494. Papua New Guinea, Central Province, Bartholomew Range, Haveri, 700 m above sea level, VIII-XI.1893, L. Loria; 1 ♂, skin and skull.

Rattus rattus (Linnaeus, 1758)

MSNG 3534. Indonesia, West Irian Jaya Province, Sorong, 1875, O. Beccari; 1 ♀, skin and skull, holotype of *Mus beccarii* Peters & Doria, 1881 and *Mus doriae* Trouessart, 1897.

MSNG 3535. Indonesia, West Irian Jaya Province, Sorong, without collecting date, L. M. D'Albertis; 1 ♂, skin and skull.

MSNG 3536. Indonesia, West Irian Jaya Province, Sorong, without collecting date, L. M. D'Albertis; 1 ♀, skin and skull.

MSNG 3537. Papua New Guinea, Western Province, Fly River, without collecting date, L. M. D'Abertis; 1 ♀ juv., skin and skull.

MSNG 3538. Indonesia, West Irian Jaya Province, Sorong, 1872, L. M. D'Albertis; 1 juv., alcohol.

MSNG 54194. Indonesia, West Irian Jaya Province, Sorong, without collecting date, L. M. D'Albertis; 1 juv., alcohol.

R e m a r k s . PETERS & DORIA (1881) based the name *Mus beccarii* on MSNG 3534, a commensal house rat collected at Sorong. Noting that this name was preoccupied by *Mus beccarii* Jentink, 1880 (now *Margaretamys beccarii*; see MUSSEY & CARLETON 2005), TROUESSART (1897: 472) introduced the name *Mus doriae* to replace it.

Rattus sordidus (Gould, 1858)

MSNG 3260 (a and b). Papua New Guinea, Central Province, Kapa Kapa, VI-VII.1891, L. Loria; 1 ♂ (a), 1 ♀ (b), skin and skull.

MSNG 3501. Papua New Guinea, Central Province, Kapa Kapa, V-VI.1891, L. Loria; 1 ♂, skin and skull [MSNG 3501 (a)], paralectotype of *Mus gestri* Thomas, 1897.

MSNG 3501 (b - e). Papua New Guinea, Central Province, Kapa Kapa, V-VII.1891, L. Loria; 1 ♂ (c), 2 ♀♀ (b and d), skin and skull; 1 ♂ (e), alcohol.

R e m a r k s . THOMAS' (1897) description of *Mus gestri* was based on these two "co-types" (= syntypes) collected by Loria at Kapa Kapa, apparently MSNG 3501 and BMNH 97.8.7.72. TAYLOR *et al.* (1982: 269) formally designated BMNH 97.8.7.72 as the lectotype of *levipes*, but we judge that RÜMMLER (1938: 208) had already fixed a lectotype by his indication that Thomas' BMNH syntype should be considered the "type" ("der Typus"). MSNG 3501 is a paralectotype.

Rattus verecundus (Thomas, 1904)

MSNG 3517. Papua New Guinea, Central Province, Bartholomew Range, Moroka, 1300 m above sea level, X.1893, L. Loria; 1 ♀, skin and skull.

Uromys caudimaculatus (Krefft, 1867)

MSNG 3248. Papua New Guinea, Western Province, Katau, without collecting date, L. M. D'Albertis; 1 specimen, skin, holotype of *Uromys validus* Peters & Doria, 1881.

MSNG 3605 (a). Papua New Guinea, Central Province, Kapa Kapa, VII.1891, L. Loria; 1 ♂, skin and skull.

MSNG 3605 (b). Papua New Guinea, Central Province, Aroma Bay, IX.1889, L. Loria; 1 specimen, skin and skull.

R e m a r k s . The holotype of *Uromys validus* is represented at Genova only by a skin, and TATE (1951) suspected that the accompanying skull was lost. The first author recently discovered the type skull at BMNH, misplaced in a drawer with type specimens of other *Uromys*. We advocate the return of the skull to Genova to reunite the type material of *Uromys validus*.

Though *Uromys validus* Peters & Doria, 1881 is usually regarded as a synonym of the large and widespread species *Uromys caudimaculatus*, patterns of geographic variation in Melanesian *Uromys* remain poorly understood (MUSSEY & CARLETON 2005). As currently recognized, "*Uromys caudimaculatus*" is likely to represent a complex of related species. As the oldest name applied to a Melanesian population of *Uromys*, further study may show that the epithet *validus* is the most appropriate name for a distinct species endemic to the Melanesian region.

Uromys nero Thomas, 1913

MSNG 54213. Papua New Guinea, Central Province, Bartholomew Range, Haveri, VIII-XI.1893, L. Loria; 1 ♂, skin and skull. Ex MSNG 3605 (c).

R e m a r k s . Following the revision presented by TATE (1951), many large scansorial rat species from New Guinea and north-eastern Australia have been lumped together under the name “*Uromys caudimaculatus*” (e.g. FLANNERY 1995a, 1995b). These include specimens from populations that HELGEN (2007) refers to a number of distinct species, including *U. nero* and *U. scaphax*, in advance of a formal revision (MUSSEY & CARLETON 2005). We tentatively associate this specimen with the name *Uromys nero* Thomas, 1913, an identification that awaits detailed exposition in a future review of the *caudimaculatus* species-complex (HELGEN 2007).

Uromys rex (Thomas, 1888)

MSNG 3459. Solomon Islands, Guadalcanal Province, Guadalcanal, 6.V.1889, C. M. Woodford; 1 ♂, skin and skull; bought by Gerrard.

R e m a r k s . Only a handful of specimens of *Uromys rex* are preserved in world museums (see GROVES & FLANNERY 1994). The holotype and three paratypes of *Uromys rex*, all collected at Aola by Woodford, are preserved at BMNH (THOMAS 1888; TATE 1951). It is unclear whether MSNG 3459 was collected at the same time or place as the type series (i.e. with the date listed above an indication of its receipt by the museum, rather than the date of collection) or whether it was truly secured later than Thomas’ original series.

Uromys siebersi Thomas, 1923

MSNG 3245. Papua New Guinea, Kai Islands, without collecting date, O. Beccari; 1 ♂, skin and skull.

R e m a r k s . The *Uromys* of the Kai Archipelago is *U. siebersi*, a distinctive species endemic to these islands (MUSSEY & CARLETON 2005), formerly included within the synonymy of *U. caudimaculatus* (see above). The species was last collected in 1922 (THOMAS 1923) and very few specimens of *U. siebersi* are preserved in world museums. Apart from the specimen at Genova, there are only three others—the holotype at BMNH (THOMAS 1923), a paratype in the

Museum Zoologicum Bogoriense in Cibinong, Indonesia (formerly the Buitenzorg Museum), and a skull in Berlin (ZMB 5682).

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REFERENCES

- APLIN K.P., PASVEER J.M. & BOLES W.E., 1999 - Late Quaternary vertebrates from the Bird's Head Peninsula, Irian Jaya, Indonesia, including descriptions of two previously unknown marsupial species - *Records west. Austr. Mus.*, Perth, Suppl. 57: 351-387.
- BECCARI O., 1924 - Nuova Guinea, Selebes e Molucche. Diarii di viaggio ordinati dal figlio Prof. Dott. Nello Beccari, con introduzione e note del Prof. Luigi Buscalioni - Soc. An. Editrice "La Voce", Firenze, xxxviii+468 pp.
- BONACCORSO F. J., 1998 - Bats of Papua New Guinea - Conservation International Tropical Field Guide Series, Conservation International, Washington, D. C., 489 pp.
- CAPOCACCIA L. & POGGI R., 1982 - Short history of the Museo Civico di Storia Naturale "Giacomo Doria" in Genoa, Italy - *Archives Nat. Hist.*, London, 11 (1): 107-122.
- D'ALBERTIS L. M., 1879 - Journeys up the Fly River and in other parts of New Guinea - *Proc. R. Geogr. Soc. monthly Rec. Geogr.*, London, New Monthly Series, 1(1): 4-16.

- D'ALBERTIS L. M., 1880 - New Guinea: What I did and what I saw - S. Low, Marston, Searle, & Rivington, London, 2 vols., 424+406 pp.
- DENNIS E. & MENZIES J. I., 1979 - A chromosomal and morphometric study of Papuan tree rats *Pogonomys* and *Chiruromys* (Rodentia, Muridae) - *J. Zool.*, London, 189: 315-332.
- FLANNERY T. F., 1995a - Mammals of New Guinea. Revised and updated edition - Comstock/Cornell, Ithaca, New York, 567 pp.
- FLANNERY T. F., 1995b - Mammals of the South-West Pacific and Moluccan Islands - Comstock/Cornell, Ithaca, New York, 464 pp.
- GESTRO R., 1928 - Le origini e lo sviluppo del Museo Civico di Storia Naturale "Giacomo Doria" - *Boll. Soc. Amici Mus. civ. St. nat. "G. Doria"*, Genova, 1: 1 - 53.
- GIBBNEY H. J., 1972 - D'Albertis, Luigi Maria (1841-1901) (p. 2) - In Pike D. (ed.), Australian Dictionary of Biography: 1851-1890, D-J, Vol. 4, Melbourne University Press, Carlton, 494 pp.
- GROVES C. P. & FLANNERY T. F., 1994 - A revision of the genus *Uromys* Peters, 1867 (Muridae: Mammalia) with descriptions of two new species - *Rec. Austr. Mus.*, Sydney, 46: 145-169.
- HELGEN K. M., 2005 - The amphibious murines of New Guinea (Rodentia, Muridae): the generic status of *Baiyankamys* and description of a new species of *Hydromys* - *Zootaxa*, Auckland City, 913: 1-20.
- HELGEN K. M., 2007 - A taxonomic and geographic overview of the mammals of Papua (pp. 689-749) - In Marshall A. J. & Beehler B. M. (eds.), The Ecology of Papua, Ecology of Indonesia Series, Vol. VI, Part One, Periplus Editions, Singapore, 749 pp.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE, 1999 - International Code of Zoological Nomenclature. Fourth Edition - The International Trust for Zoological Nomenclature, London, xxix+306 pp.
- LAURIE E. M. O. & HILL J. E., 1954 - List of land mammals of New Guinea, Celebes and adjacent islands 1758-1952 - British Museum (Natural History) Publications, London, 175 pp.
- LOVERIDGE A., 1948 - New Guinean reptiles and amphibians in the Museum of Comparative Zoology and the United States National Museum - *Bull. Mus. comp. Zool.*, Cambridge, 101 (2): 305-430.
- MCDOWELL S. B., 1975 - A catalogue of the snakes of New Guinea and the Solomons, with special reference to those in the Bernice P. Bishop Museum. Part II. Anilioidea and Pythoninae - *J. Herpetol.*, New Haven, 9: 1-79.
- MENZIES J. I., 1989 - Designation of a lectotype for *Melomys levipes* (Thomas, 1897) (Rodentia: Muridae) of New Guinea - *Sci. New Guinea*, Papua, 15: 108-110.
- MENZIES J. I., 1990 - A systematic revision of *Pogonomelomys* (Rodentia: Muridae) of New Guinea - *Sci. New Guinea*, Papua, 16: 118-137.
- MENZIES J. I., 1996 - A systematic revision of *Melomys* (Rodentia: Muridae) of New Guinea - *Aust. J. Zool.*, Collingwood, 44: 367-426.
- MUSSER G. G. & CARLETON M. D., 1993 - Family Muridae (pp. 501-755) - In: Wilson D. E. & Reeder D. R. (Eds.), Mammal Species of the World: A Taxonomic and Geographic Reference, second edition, Smithsonian Institution Press, Washington, D.C., xviii+1207 pp.
- MUSSER G. G. & CARLETON M. D., 2005 - Family Muridae (pp. 894-1531) - In: Wilson D. E. & Reeder D. R. (Eds.), Mammal Species of the World: A Tax-

- onomic and Geographic Reference, third edition, Johns Hopkins University Press, Baltimore, 2000 pp.
- MUSSER G. G., HELGEN K. M. & LUNDE D. P., in press - New Guinea rodents (Muridae, Murinae): systematic review of *Leptomys* with descriptions of two new species - *Amer. Mus. Novit.*, New York.
- PETERS W., 1874 - Diagnosi di tre nuovi Mammiferi della Nuova Guinea ed Isole Kei - *Annali Mus. civ. St. nat. Genova*, 6: 303.
- PETERS W. & DORIA G., 1876 - Diagnosi di 3 nuove specie di Mammiferi della Nuova Guinea e di Salawatti - *Annali Mus. civ. St. nat. Genova*, 8: 335-336.
- PETERS W. & DORIA G., 1881 - Enumerazione dei Mammiferi raccolti da O. Becconi, L.M. D'Albertis ed A.A. Bruijn nella Nuova Guinea propriamente detta - *Annali Mus. civ. St. nat. Genova*, 16: 664-710.
- PUTHZ W., 1971 - Revision of the *Stenus* species of New Guinea. Part I. (Coleoptera: Staphylinidae) - *Pacific Insects*, Honolulu, 13 (3-4): 447-469.
- PUTHZ V., 1982 - Neue und alte *Stenus*-Arten aus Neuguinea (Coleoptera, Staphylinidae). 186. Beitrag zur Kenntnis der Steninen - *Reichenbachia*, Dresden, 20 (16): 119-143.
- RÜMMLER H., 1938 - Die Systematik und Verbreitung der Muriden Neuguineas - *Mitt. zool. Mus. Berlin*, 23: 1-297.
- TATE G. H. H., 1940 - Notes on the types of certain early described species of monotremes, marsupials, Muridae, and bats from the Indo-Australian region - *Amer. Mus. Novit.*, New York, 1061: 1-10.
- TATE G. H. H., 1951 - Results of the Archbold Expeditions. No. 65. The rodents of Australia and New Guinea - *Bull. amer. Mus. nat. Hist.*, New York, 97: 183-430.
- TAYLOR J. M., CALABY J. H. & VAN DEUSEN H. M., 1982 - A revision of the genus *Rattus* (Rodentia, Muridae) in the New Guinean region - *Bull. amer. Mus. nat. Hist.*, New York, 173: 177-336.
- TAYLOR J. M. & HORNER B. E., 1973 - Results of the Archbold Expeditions. No. 98. Systematics of native Australian *Rattus* (Rodentia, Muridae) - *Bull. amer. Mus. nat. Hist.*, New York, 150: 1-130.
- THOMAS OLDFIELD M. R., 1888 - Diagnoses of six new mammals from the Solomon Islands - *Ann. Mag. nat. Hist.*, London, (ser. 6) 2: 155-158.
- THOMAS OLDFIELD M. R., 1897 - Viaggio di Lamberto Loria nella Papuasias Orientale. XIX. On the mammals collected in British New Guinea by Dr. Lamberto Loria - *Annali Mus. civ. St. nat. Genova*, 38: 606-622.
- THOMAS OLDFIELD M. R., 1908 - A new *Pogonomys* presented to the British Museum by Sir William Ingram - *Ann. Mag. nat. Hist.*, London, (ser. 8) 2: 495-496.
- THOMAS OLDFIELD M. R., 1920 - New small mammals from New Guinea - *Ann. Mag. nat. Hist.*, London, (ser. 9) 6: 533-537.
- THOMAS OLDFIELD M. R., 1923 - A new *Uromys* from the Kei Islands - *Treubia*, Batavia, 3: 422.
- TROUESSART E. L., 1897 - Catalogus mammalium tam viventium quam fossilium. Nova edition (prima completa). Fasciculus III, Rodentia II (Myomorpha, Hystricomorpha, Lagomorpha) - R. Friedländer and Sohn, Berlin, pp. 453-654.
- VAN STEENIS KRUSEMAN J., 1950 - Malaysian plant collectors and collections being a cyclopaedia of botanical exploration in Malaysia and a guide to the concerned

literature up to the year 1950, with some introductory chapters by C. G. G. J. van Steenis - *Flora Malesiana*, Leiden, vol. 1: 1-638.

WALLACE A. R., 1880 - D'Albertis' "New Guinea" - *Nature*, London, 23: 581-582.

WINTER J. W. & WHITFORD D., 1995 - Prehensile-tailed rat, *Pogonomys mollipilosus* (pp. 643-645) - In: Strahan R. (Ed.), *Mammals of Australia*, Smithsonian Institution Press, Washington, D. C., 756 pp.

WOODFORD C. M., 1890 - A naturalist among the head-hunters, being an account of three visits to the Solomon Islands in the years 1886, 1887, and 1888 - E.A. Petherick and Company, Melbourne, 249 pp.

ABSTRACT

Catalogue of Melanesian Rodents (Mammalia: Rodentia) in the Museum of Genova.

The Museum of Genova holds an historically important collection of 206 rodent specimens from Melanesia (the large tropical island of New Guinea and adjacent smaller islands), collected during the late nineteenth century. The collection houses a number of Melanesian rodent type specimens, including six holotypes, one lectotype, one syntype, paralectotypes for five taxa, and four paratypes. Also to be found in the collection are exemplars of several species very rare in collections, such as the large endemic insular murines *Uromys rex* (of Guadalcanal in the Solomon Archipelago) and *Uromys siebersi* (of the Kai Archipelago of Indonesia).

The Authors present revised identifications of all Melanesian rodents represented in the collection, discuss the localities where these specimens were obtained, and provide photographic illustrations of selected type material.

RIASSUNTO

Catalogo dei Roditori (Mammalia: Rodentia) della Melanesia nel Museo di Genova.

Nel Museo di Genova è conservata un'importante collezione di 206 Roditori della Melanesia (comprendente la grande isola tropicale della Nuova Guinea e le più piccole isole adiacenti) raccolti nel XIX secolo. Nella collezione sono presenti anche esemplari tipici: sei olotipi, un lectotipo, un sintipo, paralectotipi di cinque specie e quattro paratipi. Vi sono anche rappresentanti di specie molto rare nelle collezioni museali come i grossi murini, endemiti insulari, *Uromys rex* (di Guadalcanal nell'Arcipelago delle Solomon) e *Uromys siebersi* (dell'Arcipelago delle Kai dell'Indonesia).

Vengono riportate le determinazioni aggiornate di tutti gli esemplari, sono esaminate le località di raccolta e vengono fornite le fotografie di alcuni esemplari tipici.

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